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HARVEY J. BURKHART, D. D. S.

Director of Eastman Dental Infirmary.

THE JOURNAL

—OF THE—

National Dental Association

VOL. 3 MAY, 1916 No. 2

ORIGINAL COMMUNICATIONS.

SOME BASIC PRINCIPLES AND METHODS IN THE REPRODUCTION OF MANDIBULAR MOVEMENTS.

By Dayton Dunbar Campbell, D. D. S., Kansas City, Mo.

(Read before the National Dental Association.)

IN THIS paper it is the purpose of the writer to show how all movements of the human jaw that are of importance to us as Prosthetists, may be used as guides to reproduce like movements on a variable or adjustable mechanical contrivance, termed an Articulator.

Eleven pairs of muscles are attached to the mandible and by the action of one-half pair, or more, of muscles, a certain definite movement is described along some path of the jaw. The return-to-rest position or distal occlusion is accomplished by the other half of this same set of muscles or may be so modified by the action of the other pairs or groups of muscles as to cause its return by a more circuitous route.

In securing the different tracings of the mandible in its varied movements, we are to concern ourselves with that portion only of the tracing that is nearest the position of rest. We consider this portion and neglect the rest of the tracing because the wide-open jaw, great protrusion, and extreme lateral movements are of no importance in masticatory effort.

As astronomers, after a few hours' observation of some satellite, are enabled to compute correctly the diameter of its orbit by simply referring to the arc of the circle described by the eye piece of the telescope, so we, having established a tooth plane, (as herein described) are enabled to compute the angle of inclination formed by the condyle path, the lateral condyle path, and the incisal path, in conjunction with this plane, thru simply consulting a portion of the tracing

produced by the mandible in some one of its movements.

The most extraordinary feature of this whole procedure is that the centers from which these paths are reproduced have no tangible location in the individual but are purely imaginary. However, these centers do have on the Gysi Adaptable Articulator a definite position and on it are easily located. The Gysi Adaptable Articulator is a practical as well as a scientific instrument and one that enables the student to arrive at a knowledge of the various movements of the mandible so that this information may be used to construct eminently satisfactory dentures upon the Gysi Symplex—an articulator that is not adjustable but having an average condyle path, lateral condyle path, oscillating or rotating points, and an Incisal guide.

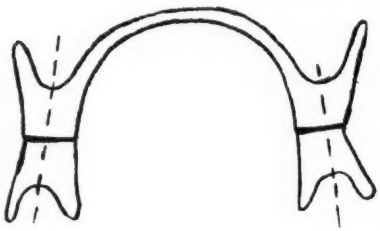


Figure 1.

The Gysi Adaptable is for the student and teacher, and your essayist is constrained to believe that it will never become popular with the majority of the profession. The ideal articulator, of course, would be the mandible and maxillae of each individual patient and there are some in the profession who obtain excellent results by placing all the teeth in their respective positions on the contour or bite plates while in the mouth. A modification of this rule is advisable and in all instances is essential where the Gysi Adaptable is not used.

Let us here point out the fact that Anatomical Occlusion is not a panacea for all the denture ills to which the Prosthetist is heir. Anatomical Occlusion is but one factor in the process of the construction of a proper masticatory apparatus for the edentulous mouth. By Anatomical Occlusion we mean the proper distribution of leverage in the arrangement of the teeth so that in the incisal or masticatory effort of the jaw, the dentures may be balanced or prevented from tipping. This may be simply illustrated by attempting to balance a hoop or U shaped piece of any material on two points; it may be done, but with three, four, five, or more points of suspension, it becomes less difficult. Let us say, then, "three or more points of contact."

It would seem then, on first thought, that Anatomical Occlusion was of no importance until the teeth were in contact —or occlusion—and that, up to this point, the retention of the denture was purely a question of adaptation in the upper or of weight in the lower. But in constructing the dentures, we place the teeth so that, approximately, a line drawn from the crest of the upper to the lower will pass thru the long axis of the tooth and at right angles to the base planes of the plates, in this way (Fig. 1) satisfying the two physical laws of force controlling the leverage with which we are concerned, i. e. first, Force moves in a straight line and at right angles to the surface from which it emanates; second, The combined direction of two or more forces is their resultant. It is now apparent that the phrase Anatomical Occlusion is, in a measure, a misnomer; for in many instances it would be the height of folly to set the teeth anatomically correct as they are set in the mouth which has a full complement of teeth in good occlusion.

Here each tooth sets rigid in its respective alveolus while the same tooth on the plate is on a moveable base. The upper has absorbed up and in and is smaller; the lower, down and out and is larger. The teeth must be smaller and should

be sharper than a normal tooth so as to more easily comminute the food and lessen the stress upon the easily irritated membranes under the bases. Figures 2-A, 2-B, 2-C, from the Dental Digest show

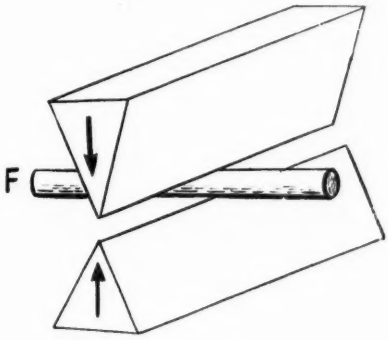


Figure 2-A.

diagrammatically the cutting power and action of wedges—cusps. (Fig. 2-A).

"I—Upper and lower teeth set to straight up and down movement only may be diagrammatically illustrated by the two wedges here shown. It required much force to push them thru the food shown as "F." This is illustrated to

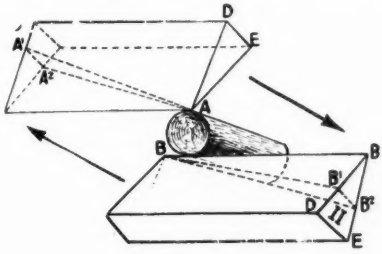


Figure 2-B.

every man who shaves, by the fact that a straight downward movement of the razor across the little hairs "pulls" while a slight sideways movement, does not.

A sideways movement of the teeth may be here diagrammatically represented by two wedges and the food by the round body between them. If the wedges are forced thru vertically great pressure will be required. (Fig. 2-B).

If the wedges be put in the position B. and moved in a direction shown by the arrows very much less force will be required. The reason is that the cutting form of the wedge is changed. With this motion the form of the wedge is not the triangle formed by the lines A, D, E, but the much sharper angle which is drawn inside each triangle and lettered A, A-1, and A-2, and B, B-1, and B-2, and exactly reproduced in the position C. (Fig. 2-C).

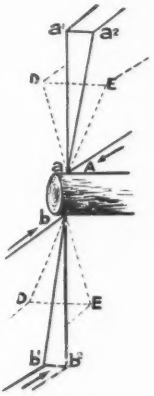


Figure 2-C.

This greater biting power can be seen by comparing the triangles in position C with those in position A. The triangles A, A-1, and A-2, and B, B-1, and B-2 have about three times the biting power of the triangle A, D, and E."

It is absolutely essential to the construction of a perfect set of teeth, that the foundation trial plate of the denture be of some rigid construction that will not warp, spring or give when heated to body temperature by placing in the mouth; and deviation from this rule will be paid for later by loss of time, oft' times by loss of temper, and in no small number of cases, by loss of the patient. One of the trial-plate materials on the market is very brittle, thru an excess of

shellac; another is elastic enough to creep away from the cast when apparently cold, therefore, this one is treacherous; another, and by far the best, contains a goodly amount of gutta percha.

By placing a piece of this trial plate over the cast, and warming it gently and evenly with the brush flame of a blow pipe, it will conform to the cast with a

Figure 3.

very little assistance of moistened fingers.

Your essayist prefers the vulcanized base advocated by Dr. George H. Wilson, in his Double Vulcanization Method. It takes very little more time to construct, and possesses two distinct advantages. First, in the event of a faulty impression or if for some other reason the trial base is not a perfect adaptation, the time and labor of constructing the entire denture anew is saved. Second, the vulcanized base may be mounted on the Gysi Adaptable Articulator and after the dentures are completed, returned to the articulator to prove the occlusion. In this article where reference is made to occlusion models or trial plates, the base is vulcanite.

After the bases are sandpapered they are poured with plaster of paris, and the occlusion models prepared, by kneading a sheet of pink paraffine wax over a flame until the grain of the wax disappears and it becomes a homogeneous mass; this is rolled out to the thickness of the little finger, one end held in the flame and the dripping wax conveyed to the crest of the ridge of the base plate; the roll of wax is now conformed to the ridge and given

Figure 4

the general shape of the universal base plate gauge, made of sheet steel, patterned by Dr. Gysi and shown in Fig. 3. By using this gauge as a guide, the upper and lower occlusion models assume the same definite shape and form, and when the patient arrives, much time is saved at the chair. (Anyone desiring one of these gauges need but send a few cents postage to the writer when it will be mailed free). Both occlusion models are made larger than necessary so they may be trimmed to the proper length and contour. This is decidedly better than having them too small and attempting to add to them at the chair.

The crest of the ridge of each occlusion model is now pressed against some smooth surface and made flat. Insert the upper model and try the adaptation; if satisfactory trim the wax down to a

sixteenth of an inch below the lip line when at rest, and from the medium line to the heels, so that the resulting surface of the ridge will correspond to the original tooth plane.

This tooth plane is the starting point in the scientific arrangement of artificial teeth for edentulous mouths. We will constantly refer to it, measure in almost every direction from it, and come back to it repeatedly; in fact, every movement of the jaw and every tooth on the base, is given its particular position with reference to this plane. Its correct location is of more importance by far than that of the median line, still it is no more difficult to locate. If we were to take almost any adult mouth containing a full complement of teeth (Fig. 4) and in fairly good occlusion, and grind off the sharp cusp of one of the bicuspids; then place a knitting needle against the ground cuspid and run it back thru the sulci of the two bicuspids and first molar, we should find the remaining portion of the needle out of the mouth to be on a horizontal line, parallel with a line drawn from the base of the nose to the external opening of the ear. So this knitting needle then, is the tooth plane (Fig. 5) and if we could look thru the patient's cheek, we should see that the first molar barely touches it like the lateral in front, while the third molar has stepped away quite a bit and that the incisal edge of the central is slightly below. This holds good in nearly every instance and every student of anatomical articulation is urged to verify this for himself either by his patients or from casts practically normal in occlusion.

Now with this "knitting needle tooth plane" in mind, we proceed to trim the lower border of the upper occlusion model to it; by placing a foot ruler along the side of the face, we may draw a line on the face from the base of the nose to the external opening of the ear, however, one soon becomes proficient with a ruler and a small case knife and it is seldom necessary to mark the face. The blade of the case knife is held tightly against the occlusion surface of the model with the left hand, the right hand holding the ruler; by sighting along the ruler and noting the position of that portion of the knife out of the mouth, the changes to be made in the wax are indicated. (Fig. 6). A tendency in the projections of the two lines made by the ruler and knife respectively, to meet in front, means that the wax model is too long in the molar region—which is often the case; the reverse of this, a tendency in

Figure 5.

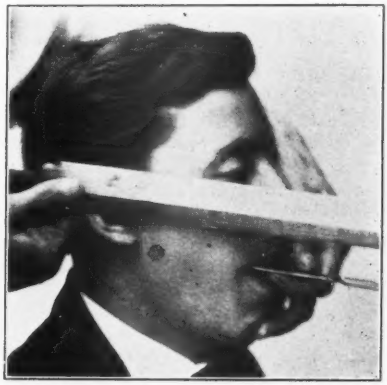


Figure 6.

the projections of these two lines to further diverge, is evidence that more wax must be added in the molar region rather than that the anterior part, which has already been trimmed to meet requirements of the lip line, should be cut away.

In this process of conforming the base of the upper occlusion model of the tooth plane, it is oftentimes advantageous to sprinkle the maxillary surface of the base with powdered gum tragacanth; this will literally stick the plate up to place, and while assisting the operator, will lend confidence to the patient.

The lower occlusion model is now inserted and trimmed to the approximate length and contact, removed, and its surface heated from heel to heel lengthwise with a sizzling hot spatula; this heating is continued until the surface, except for its borders, is liquid. The advantage of heating the surface lengthwise may now be readily seen, since to draw the hot spatula crosswise would be to invite the melted wax to flow off of the model. The lower occlusion model is returned to the mouth and the patient instructed to close easily, but firmly, until the lips assume a natural position of rest, easy and not protruding. Protruding lips may be caused by the occlusion model being too large or shutting too close together. This latter condition, especially in the "biscuit bite" is the bugaboo of the dental laboratories, who, by the way, construct dentures that are marvels in adaptation and workmanship—when you take into consideration the impressions, "bites" and meager instructions they receive.

The lower model is now removed and the excess wax cut away and returned to the mouth to get the relation of the two models with the jaw at rest, i. e. in distal occlusion. Every dentist has his favorite "method" of "getting the bite" —so it will be sufficient here to note that when the proper relation of the occlusion model is obtained, the anterior ramifications of the temporal muscles may be left to stand out distinctly under biting stress, a muscular contraction that cannot be created by any other position of the mandible. With the occlusion models in their correct relative positions, the medium, high, and low lip lines, are indicated and all other marking and contouring done; the models are removed separately and placed in cold water.

The location of the condyles may be ascertained by placing the index finger about one quarter of an inch in front of the tragus of the ear and on a line drawn to the outer canthus of the eye. As a matter of convenience, this point may be marked with a pencil or a bit of black court plaster. At this juncture if the Gysi Simplex is to be used instead of the Adaptable, the prongs of the fork of the Snow face-bow are now heated and forced into the body of the upper

Figure 7.

wax occlusion model; an attempt is usually made to get it in the median line, and parallel with the tooth plane, altho neither position is imperative; the end of the fork may stick out of the corner of the mouth at an angle of a Bowery tough's cigar. If it be securely fastened in the wax model, it will, on account of the universal joint of the face--bow proper, answer the purpose for which it is designed, and that is, to obtain the relation of the maxilla to the condyles. In other words, the face-bow is the dentist's divider or caliper for producing the correct distance from the condyle of the jaw to the cutting edge of the upper incisors and a means by which this individual Bonwill equilateral triangle may be transferred correctly to the articulator. This is its sole function and should in no wise be confused with the operation commonly known as "taking a bite."

Here (Fig. 7) we have a set of teeth mounted on an occluding frame where no

face-bow is used. This same set of teeth is placed in the mouth with the result shown in Fig. 8; the distance from the condyle to the incisors is shorter when placed in the mouth, than the distance from the hinge of the articulator to the incisors. In other words, in opening and closing the articulator the cutting edge of the lower incisors describes an arc of a larger circle than will be described by the same point when placed in the mouth, consequently, the molars touch first. There can be no guess work about this; in every mouth the alveolar process of the maxilla bears a certain relation to the condyles of that particular jaw. With this distance properly registered, the "bite" can be raised and lowered with impunity, should the occasion demand it. This accounts for the action of the teeth on the old plain line occluding frame—when we tried them in the mouth they did not act so well at first, fact is, not until the wax became warm and the teeth bit into position unwittingly and to our satisfaction. Had we finished them then, without trying them again on the occluding frame, all would have been well—but no, we noticed a space between the upper and lower molars, and so we "fixed it."

With the prongs of the fork securely fastened in the upper occlusion model, it is returned to the mouth with the lower and the jaw closed in distal occlusion. The universal joint on the bow is slipped over the tail of the fork now protruding from the mouth, with the set-screw beneath the bow. The screw is set up tight and then loosened just enough to allow for proper adjustments. This is better than having the set-screw loose and depending on the patient to tighten it. It also gives the operator an opportunity to step away from his patient to make better observations. The ends of the condyle bars are set over the marks which indicate the tubercles of the condyles of the jaw, slightly touching the face, while care is taken to see that they are at equal distances from their respective lock-nuts thru which they run. This is done by counting the sections on the bar from the inner end of the bar lock-nut and adjusting the bow at the universal joint until the sections number the same on both sides. The universal joint is then set right, for this position must be maintained until securely mounted on the articulator. It is never necessary to set the lock-nuts up securely on the condyle bars while the bow is on the face.

With the face-bow adjusted, the lips are parted and the models securely united with two Bristol steel belt staples. These staples should be warmed in a

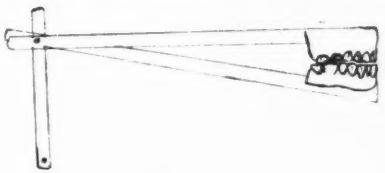


Figure 8.

flame by holding in the fingers and out of the patient's sight; then pushed firmly into the occlusion models in that region between the cuspids and first molar. When they are held in the flame with a pair of pliers, they get too hot, melt the wax and defeat the purpose for which they are intended; then, too, the patient is afraid of being burned, and oft' times shifts the jaw to some position that is not desired. After removing the occlusion models and face-bow intact, the casts are placed in the former and held in place by sealing their borders with sticky wax. The condyle bars of the face-bow are pushed all the way in and tightened, they must now be sprung over the extension pins of the Simplex Articulator. The occlusion surface of the occlusion model must now be on a parallel line with the lower bow of the articulator. This is imperative because the relation of the occlusion surface of

the model to the hinge of the articulator must correspond to the relation which the tooth plane bears to the condyle of the mandible. (Fig. 9). The Simplex Articulator has no adjustable condyle path and in the light of our present knowledge, it is not of so much importance as it was once thought to be—then too, the old method of securing the pitch or slant of the eminentia articularis by the protrusive bite and transferring this measurement to the articulator, was always approached with apprehension and, when finally secured, there was a vague

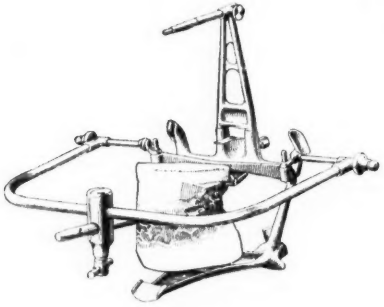


Figure 9.

sense of uneasiness lest the results were not what we should like to obtain—this was especially true when a great discrepancy was known to exist between the two eminentia.

Dr. Gysi cites one instance where there was a difference of 39 degrees and the writer recently noted a case where there was a difference of 48 degrees in the two eminentia—the discrepancy was so glaring as to indicate some error—but all doubt was eliminated with the knowledge that the lower occlusion model was held securely in position by two Gilmore clasps and that the condyle path register never varied in its markings. For the general practitioner the writer believes that the average condyle path of the Simplex with the additional improvement over the former so-called Anatomical Articulator of an average lateral condyle path and an average incisal path, will give more gratifying results than any articulator that has come to his observation—excepting, of course, the Gysi Adaptable—and insists that the former be used in conjunction always with the face-bow.

An adjustable condyle slot articulator would be sufficient if in masticatory effort we moved the jaw in and out, open and shut, like an elephant or alligator. But we don't masticate our food in this manner, we open the mouth slightly, laterally, while the bolus of food is thrust between the teeth with the tongue, and as the teeth are brought into antagonization, the liquid in the bolus is squeezed out and the final returning to occlusion lateral movements comminute or grind the food. A diagrammatic scheme of this movement is shown in Figure. 10.

A. Showing the cusp action (in section) of either a normal natural denture or properly constructed artificial dentures. On the masticating side, the mandible is obliquely depressed, moved over to that side by the pterygoid muscles, carried upward by the masticating muscles (temporal and masseter) until the cusp-to-cusp position is established, penetrating the food and partly expressing the juices from the bolus. The lower jaw is then drawn obliquely towards the median line until the lower buccal cusp rests in the upper masticatory groove as shown here in B, crushing the food and forcing it between the cusps. This process is repeated a sufficient number of times, thoroly comminuting and insalivating the food when deglutition follows. The diagrammatic scheme C. gives us an idea of the vertical and lateral movements of the mandible in masticatory movements of the mandible in masticatory efforts. Beginning at A, the position of rest with buccal cusps of the lowers in the masticatory groove of

the uppers the jaw is depressed and subsequently drawn further towards the masticating side and at the same time, the tongue thrusts the bolus of food between the teeth. Then the masticating muscles draw the separated teeth to the cusp-to-cusp position, condensing the food and expressing the juices and in the balance of the movement, B, the cusps slide back home to the rest position as in B, performing

There is no articulator on the market, save the Gysi Adaptable, that gives us a desirable rotation point for each individual patient. The Simplex with its fixed average lateral condyle and oscillation or rotation point, comes nearest it.

The drawing (Fig. 11) discloses correct and incorrect theories regarding the movement of the mandible at the condyle during the lateral movement to which reference has already been made. It

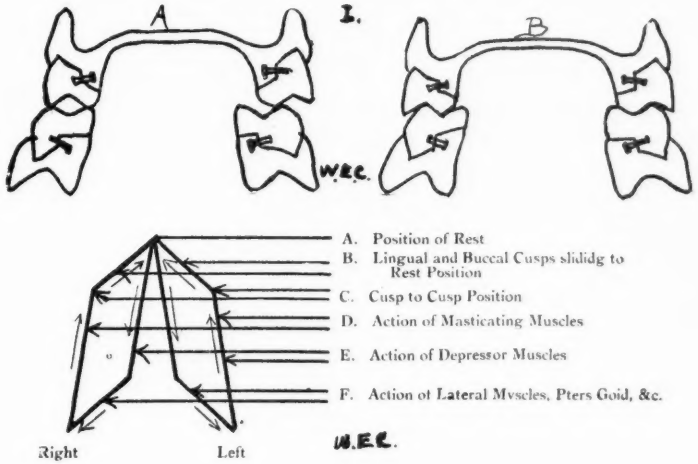


Figure 10.

their grinding and masticating function. Thus we see how impossible it is for the New Century and similar articulators to mimic this movement of the jaw. Another feature of the lateral condyle path is, that it provides for more nearly proper intercuspation of the teeth, thereby maintaining and insuring better retention of the dentures.

In each individual case there is a particular individual lateral path thru which every cusp of every tooth in the jaw passes in the lateral movement; but this particular individual path is contingent upon the correct location of the oscillation or rotation point upon which the mandible swings.

has been supposed that when the jaw was swinging on the masticating side, that it was simply swinging in a rotary movement with the opposite condyle as a center. Prof. Gysi has shown that this is incorrect and that in the lateral masticatory movement, the whole mandible moves inward laterally as well as forward while on the other side the condyle, instead of merely rotating, (as shown in the incorrect drawing) moves slightly outward as in the correct drawing. These rotation points should not be confounded with the articulator portion of the condyles in their relation to the glenoid cavities. As we have previously stated, these do not exist in the

natural jaw, but are imaginary points founded upon deductions made from measurements taken of the mandible in its lateral excursions. They are real points, however, on the mechanical articulator, and represent the mechanical center out of which this lateral movement can best be reproduced.

The Simplex Articulator has its rotation points inside of, below, and behind the heads of the condyles; and in the lateral excursion the lower incisors pass sideways and forward under the upper

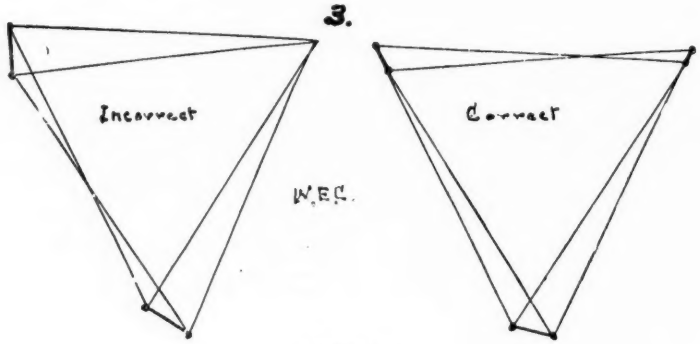


Figure 11.

incisors—more nearly mimicking nature than the articulator which is constructed with the rotation points *in* the condyles and which, as a result, forces the lower incisors more directly forward.

A distinct improvement is the incisor Guide Incline, which is, in fact, a reversed lingual aspect of the incisors. A Guide Pin keeps the casts from being forced together in manipulation, and thus lowering the bite. Consequently all of these improvements give us an articulator which will permit the grinding of the artificial teeth to forms that will be more efficient when placed in the mouth.

There is a method of trimming the wax occlusion models just before arranging the teeth, to a "compensating curve," corresponding in artificial dentures to the "curve of Spee" of the mandible; and while it is exemplary to follow nature in every possible way in arranging artificial teeth, there are problems and conditions that exist in the edentulous mouth, such as retention, easily irritated membranes, kicking muscles, etc., that can best be taken care of by applying a knowledge of physics and some principles well known to mechanics. The working out in the wax of a compensation curve is, in many instances, not necessary nor advisable in constructing dentures on either of the Gysi Articulators, and especially in the exaggerated cases, a positive detriment to the dentures. In those cases where there is a marked discrepancy in the width of the upper and lower jaws, the following cross bite is used advantageously. (Fig. 12). The first and second right upper molars are placed in the positions usually occupied by the first and second left molars, the latter occupying the position of the former, the remaining upper and lower molars are criss-crossed likewise, while buccal cusps of the now upper molars are placed to occlude between the buccal and lingual cuspids of the now lower molars. This scheme, aside from giving more freedom to the tongue, brings the masticatory groove over the crest of the ridge, and

within the line of force exerted in masticatory effort.

The Gysi Adaptable Articulator. (Fig 13).

We will now return to the occlusion models that were placed in the bowl of water, remove the lower and press into its occlusion surface, the horse-shoe plate so that the two pins that are to receive the condyle path register are on either side of the median line. There are four rather long pointed pins upon this horse-shoe, which, when pressed firmly into the wax, hold the plate se-

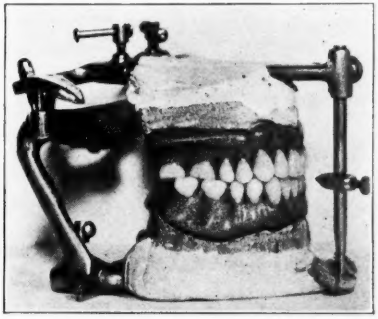


Figure 12.

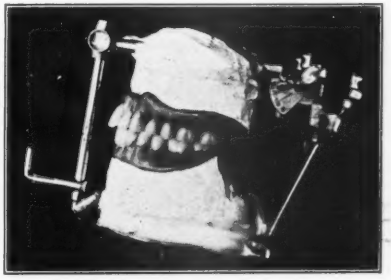


Figure 13.

curely. (Fig. 14). This is obviously essential since any movement here would give a false tracing at the pencil point. The lower occlusion model with the affixed horse-shoe plate is now placed in the patient's mouth. The added thickness of the horse shoe plate would, of course, raise the bite; to avoid this, the upper occlusion model is heated with a hot spatula from heel to heel by drawing the spatula lengthwise until the surface is a pool of wax. When the wax is congealed sufficiently, it is placed in the patient's mouth again with a request to close firmly. This will allow the occlusion models to assume the desired relations and at the same time will press the wax thru the V shaped segments on the side of the horse-shoe plate. This plate thus serves the two-fold purpose, of pressure gauge, and of an outline from which to trim the wax on the upper occlusion model so that there may be no obstruction on its surface which would prevent free movement of the mandible.

To facilitate the gliding of one occlusion model upon the other, the surfaces of each are lubricated with warm cocoa butter. The condyle path register is now slipped over the pins made to receive it. Its weight and proportions are so evenly distributed and balanced as to require nothing else to hold it in position on the jaw.

As a matter of convenience, the lateral condyle path tracings are made first by placing the points of the vertical pencils opposite the outer tubercle of the condyle—the point previously marked on the cheek with a pencil or a bit of court plaster. (Fig. 15). The lateral condyle path register is now placed over the patient's head (see illustration) with the ground glasses resting lightly upon the vertical plane or an average condyle path. The register is balanced on the finger and the glasses are pressed firmly against the head. The patient is now instructed to "make side movements," to use Dr. Gysi's own expression, and be-

fore the patient makes these satisfactorily, viz: without opening the mouth or moving the head, a certain amount of coaching is often necessary. The lateral register is now laid aside until the measurements are to be transferred to the articulator.

The pencil holders are now turned around and adjusted to point directly at the outer tubercles of the condyles. (Fig. 16). A card is placed between one of the pencils and the face, with the straight edge base of the card parallel with the occlusal plane, represented here by the broad, horizontal plates of the condyle path register. The pencil is moved up against the card, by means of the rack and pinion provided for this purpose, until the spring behind the pencil is sufficiently compressed to mark upon the card. The patient is now instructed to open and close or to make lateral movements; the tracings thus secured are intensely interesting and a few moments study here, will do more to teach one something of the movements of the mandible, than a complete set of text books on the matter. The tracings are as varied as the faces we meet on the street and while the tracings of all condyles have the same general form, it is a rare thing indeed, that the tracing of one condyle resembles the one opposite, especially in degrees of inclination to the occlusal plane. The tracings following an opening movement of the jaw are usually definite and well defined, while the return-to-rest movement often traces a circuitous route. The reverse end of the card is held in a like manner against the other side of the face and the tracing made for this side by the same method. The card is now placed aside with the lateral condyle path register for future use. The condyle path register is removed from the horse-shoe plate, care being taken not to alter the position of the pencil points since this condyle path register is to serve the purpose of the face-bow in mounting the casts on the articulator.

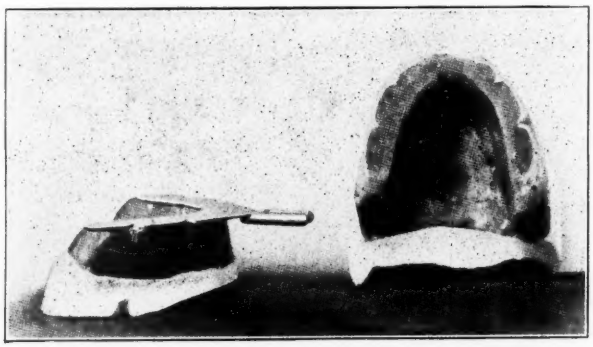


Figure 14.

It is the practice of the writer at this time, to remove the bite plates, wash them off in cold water and give the patient a rest while mounting the incisor path register and blackening the anterior portion of the horse-shoe plate to receive the tracings of the steel point of the former.

The incisal path register (Fig. 17) is designed to trace the lateral movements of the jaw upon the blackened anterior portion of the horse-shoe plate in order to give us a template or guide for the cor-

rect location of the rotation point. The anterior pointed part of this tracing is the forward point of the individual Bonwill triangle of this particular patient. The steel point of the incisal path register, is placed in the median line of the upper oocclusion model and high enough that the point while tracing may be seen by the operator.

The anterior portion of the horse-shoe

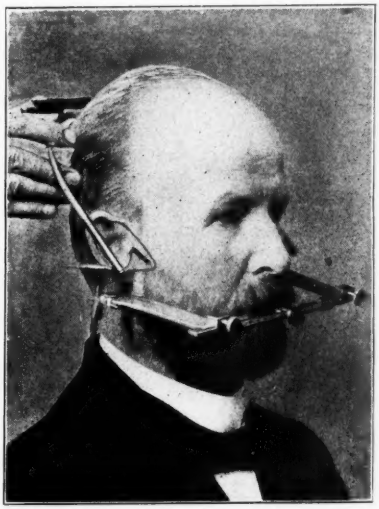


Figure 15.

plate is given a thin coating of inlay wax to which has been added a quantity of carbon, collected from an acetylene jet or obtained by burning a pledget of cotton dipped in oil of cloves. The black wax on which the teeth come will not do as it is too soft. The occlusal models are now returned to the mouth and the steel point of the incisal path register is released from the horizontal slot which has, until now, held it up out of the way, and let down into position.

The patient is instructed to move the jaw from side to side and this exercise is repeated until the blackened wax presents a broken and irregular triangular

Figure 16.

field with well defined borders, coming up to a sharp point in front. There is

Figure 17.

absolutely no guess work about this tracing. When the steel point rests in the

anterior point of the triangle, the mandible is in distal occlusion—the steel point cannot rest in this anterior portion of the triangle with the jaw in any other position.

The occlusion models are now securely fastened together with the Bristol steel belt staples.

The lateral condyle path register (Fig. 18) is now laid upon some flat, preferably white, surface so the tracings may be readily seen. A ruler is laid across the

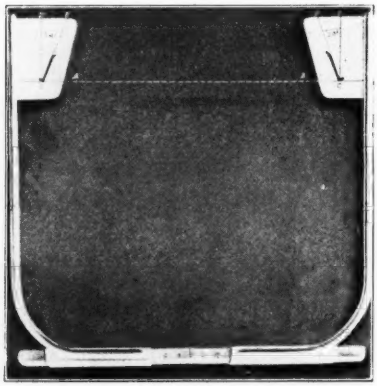


Figure 18.

two ground glass plates and a base line drawn thru the two rest points of the tracing. From each of these rest points, a vertical line is erected at right angles to the base by means of a little square like those used in mechanical drawing. The square is used to extend the tracings to the edge of the ground glass, the degree plate is slipped under the glass and its point, on the rest point of the tracing, and the nought degree base on the vertical line—the extended line of the tracing will indicate on the degree plate the proper inclination. The degree of inclination is marked on the ground glass with a lead pencil as a matter of convenience. The operation is repeated on the other ground glass. The lateral path set-screws upon both sides of the articulator are loosened and set to correspond with the degree indicated on the ground glass. The card with the condyle path tracings, (Fig. 19) is now

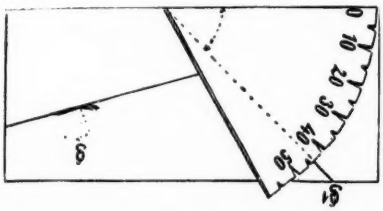


Figure 19.

laid flat and a line drawn thru the "working portion" or parallel to it. The other tracing is treated likewise, the base of the degree plate is held against the base of the card and the point of the extended tracing where it leaves the card—where the other end of this line passes thru the circumference of the degree plate—will be noted the number of degrees of inclination the ementia articularis is inclined from the occlusal plane.

The little pin is removed from the low-

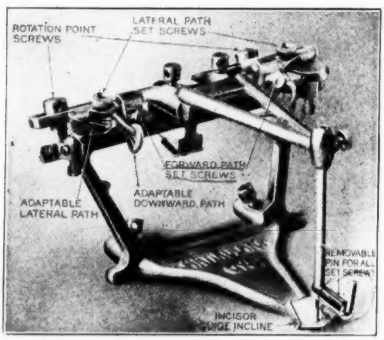


Figure 20.

er end of the incisor guide pin, (Fig. 20), and the screw that secures the condyle degree plate on the articulator is loosened and the indicator placed to corre-

spond with the tracings on the card, and the screw tightened again.

The casts are now placed in the occlusion models and sealed in place with sticky wax; the horse-shoe plate is again pushed into the holes in the condyle path register and this in turn, fastened to the goose neck on the iron stand which is designed to support the condyle path register while the casts are being

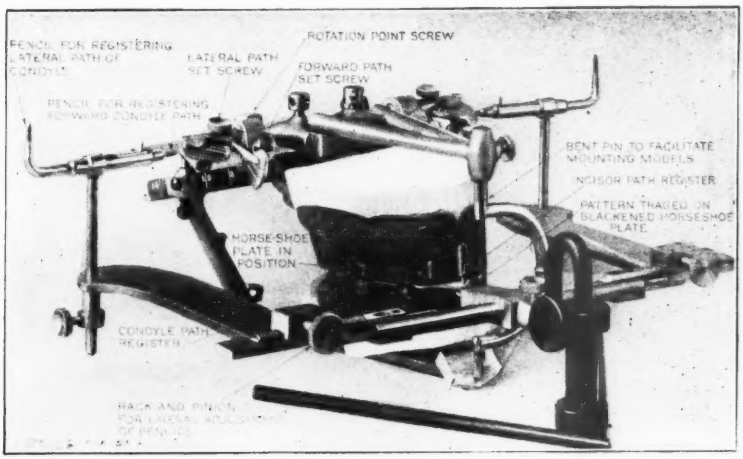

ROTATION POINT SCREW
LATERAL PATH SET SCREW
FORWARD PATH SET SCREW
BENT PIN TO FACILITATE MOUNTING MODELS
INCISOR PATH REGISTER
PATTERN TRACED ON BLACKENED HORSE-SHOE PLATE
HORSE-SHOE PLATE IN POSITION
CONDYLE PATH REGISTER

Figure 21.

luted to the articulator. The straight incisor guide pin is exchanged for the curved incisor guide pin, so that the incisor path register may be placed in the median line of the articulator and the ends of the pencils placed at the heads of the condyles. The pencils may be moved in or out with impunity, provided the incisor guide register is in the median line.

After the casts are luted to the articulator, (Fig. 21) the condyle path register and its supporting goose neck are removed from the horse-shoe plate and the final adjustment made—that of setting the oscillating or rotating points so that the teeth will, when placed in the patient's mouth, inter-cuspate properly.

The Bristol steel belt staples are removed and the steel pin in the incisor register liberated. The oscillating points are in or out, as the case may be, so that the radius between this point and the steel point in the incisal path will be the proper distance to permit the steel point in the incisal path register to exactly retrace the outer border of the triangle in the wax on the horse-shoe plate. The oscillating or rotating points are fixed, the incisal path register and horse-shoe plate removed and the straight incisal guide pin replaced. The thickness of the horse-shoe plate is replaced by a few drops of wax in the molar region; markings on the occlusion models are transferred to the upper cast for future reference; the wax is cut away the length of one side of the occlusal model, and the teeth arranged beginning at the median line.

Discussions.

Dr. J. F. Stephan.

I haven't had the pleasure of meeting Dr. Campbell, but have had the pleasure of reading his paper. To say that I liked it is expressing it mildly. The paper has been very instructive to me. The essayist has gone very thoroly into detail, and consequently anything I might say would be repetition and unnecessary. There are just a few points, however, I should like to speak of. It seems that the occlusal plane is the key to the entire situation, and anything that makes it more easy to get that is quite an addition. It is evident to all of us that the more scientific the instrument with which we can rebuild the lost dental organs, the better service we can render our patients. There is a device known as the Dabney Occlusal Plane Gage which will simplify the taking of the occlusal plane and make it a little more accurate than by the method of drawing a line with a ruler and watching that. In other words, you can manage your models, and pay less attention to the drawing of the line of the face.

It has been interesting to me to note the progress of the articulator, it having been invented about the year 1805. It has taken a century to develop this machine. It took about half a century for Dr. Bonwell to give us the Bonwell triangles. It took about a quarter of a century more to get a change in articulators that would give us a more truly anatomical articulation. I remember when I attended school in 1890, Dr. C. S. Case asked us to cut the old plane line articulator in the upper portion, the portion that held the upper casts, and to cut a slot a quarter of an inch in length, in order to get something on the order of the present condyle path as we know it, and to file off the sides of that portion that fitted between the lower part of the articulator. This gave us the possibility of the side and lateral motion of the condyle path, and by placing a piece of soft rubber between the wire that held these portions together, and the upper portions of the articulator, we were able to reproduce in a nice way something of anatomical articulation. It was in 1895 that my brother added to this, and that was the first time, I think, that the condyle path and the Bonwell triangles were united in one instrument. I have never, however, seen credit given to him for that advance. His parents on that were recorded. That antedates any other advance along these lines, even in the Bonwell articulator, the uniting of the inclined condyle path and the Bonwell articulator in one instrument. I think credit should be given Dr. Case for his advance in 1890, and to my brother for his advance in 1895.

It is true, as the Doctor has brought to our attention, that the rotation points are not found in the condyles, and that the location of the rotation points is a most important factor. We know that during life the klenoid fossa, which is sometimes one-sided may be greatly out of position. I remember making a denture as a substitute for teeth for a patient eighty years old, and who had been without those teeth 37 years. I made three dentures, and I had to carry the lower jaw a quarter of an inch back of its protruded condition. The articular point had been changed. We will find that in many cases, and if we use an instrument that will enable us to scientifically and correctly locate the rotation point, so as to reproduce the lost organs correctly, then we are doing scientific work. In the Gysi articulator there seems to be one important change that should be made, and that is in the incisal plane. I think that should be made adjustable, because if the over-bite is short, and the rotation points are between the condyles, then with the present articulator we cannot reproduce that as well as we should. If the over-bite is long, where the rotation points are

outside of the condyles, it is more nearly correct. True, the difference in rotation is not much in degrees, but if we are to do scientific work and be correct, then those points should be made adjustable, as the condyle path is.

Dr. Campbell's paper has been so exhaustive that it would require considerable study for all of us to thoroly comprehend all his points. I wish to thank him for writing the paper, and the Committee for asking me to do what little I might do of service on this program. (Applause.)

Dr. Charles A. Hawley, Washington, D. C.

I feel somewhat embarrassed in attempting to discuss this paper, because I had not the privilege of seeing it before it was read. I am therefore in the position of an extemporaneous speaker. In addition to that, this work that has been presented is entirely outside of my field of work. I presume the President of the Association, when he asked me to discuss the paper, thought I might contribute something to the subject in the way of study of the tempero-maxillary articulation from the standpoint of an orthodontist. It is probable that the orthodontists in the last ten years have observed as closely and have studied as carefully this articulation, as any other class of dentists. I will only present this view of the problem. We know that it is rare to find a denture in anything like normal occlusion. You rarely find a set of teeth where there have been normal mandibular movements during life. You are not seeing the jaws of people who have been treated by orthodontists, or perhaps that would not be true. So you have people in whom the condyle path is abnormal. In children and in people who have been fortunate to develop a somewhat perfect mandibular movement, you have a normal tempero-maxillary articulation. Now you are attempting to place in a skull, where this articulation is abnormal, and adapted to a purely artificial motion of the teeth, governed by their occlusion and by the number of teeth they have lost, a denture which must be moved along perfect paths, and you of course will have some difficulties along that line. As far as the observations that have been made as to this tempero-maxillary articulation go, we know it changes at all times of life. Bone grows and changes constantly, according to the pressure not only of the hard and soft tissues, but according to the movements of the muscles. The question entered my mind as to how much it would be possible for you to take account of that fact. We have in the skulls of people places where this articulation is entirely different, where it is adapted to different positions of the teeth. Recently I saw a remarkable skull in which the condyle had established articulation actually on the temporal bone; on account of loss of teeth, the mandible had moved forward and to one side, and established articulation in that place. We find many which have established almost a fixed articulation on one side and a sliding on the other. I wonder what occurs when you insert in that jaw a denture that is articulated according to this method. (Applause.)

Dr. Alsofar.

The essayist has imparted so much information upon the subject in hand, and that information is so scientific, that he leaves little for me to do save to call attention to some details and principles which could not be included in his paper without making it too long.

The first of these details is the character of the series of movements by which the mouth is opened and closed in the taking and mastication of food.

The first part of the opening movement is straight downward, and that when a certain degree of opening is reached the movement leaves the straight line and deflects to the right or

left, to the side engaging in mastication. The upward movement is nearly vertical until the teeth come into contact in lateral occlusion. Thru the movement in which the upper and lower teeth articulate, the mandible returns to the position of central occlusion.

The distance which the jaw habitually moves laterally when masticating without consciousness of that movement, has never been determined, but it is believed to be very short in most patients. I have had many patients in whom the condition of the wear in the teeth indicated the presence of rather wide lateral movements. The extent of this movement doubtless differs with different people.

I believe, however, that we should not confine the lateral movements of our articulators to the distance actually traveled by the jaw in this unconscious lateral movement, because it would not then be possible to so place the teeth that the dentures might not be dislodged by wider movements of the mandible. A wider range in articulators enables us to arrange teeth better. This is merely an application of the principle to which Dr. Gysi has often called attention, that our appliances should be scientific and accurate, but that they need not be exact duplicates of the human masticatory apparatus.

The essayist has called attention to the fact that an astronomer can plot the entire path of a heavenly body from a relatively small portion of its arc, and I shall use this most happy illustration to show that when the human teeth have all been lost, we can plot the habitual movements of the patient's jaw, and from them determine the arrangement of artificial teeth which will harmonize with those movements, as I specialize more and more in anatomical articulation, I come to appreciate more and more highly the efficiency and value of the jaw movements as established by the natural teeth and to desire more and more to harmonize my work with them rather than to arrange teeth without regard to them, and with the strong probability of destroying them. Perhaps you may care to know the reason for this belief.

The movements habitual to the mandible of the patient were undoubtedly the results of the articulation of the patient's natural teeth. The condyles are in opposite position before the teeth are, and the movements of the jaw upon whatever form of condyles exists, guide the newly erupted teeth to place in the arch. But when those teeth reach a position where what we call "Anatomical Articulation" exists, that is when the teeth properly oppose and support and lock each other, the sliding of the teeth, uppers and lowers, determines the movements of the mandible, and the forms of the articulating surfaces in fossae and condyles, and doubtless the muscular action and perhaps even the muscular formation, are determined by the articulation of the teeth. It is very probable that when all the teeth are in what we call correct positions, the movements of both sides of the jaw are either identical or closely similar.

But with the loss of the teeth in the irregular manner, which is common, the movements of the jaw become deranged from the symmetry they may formerly have presented, and the movements of the two sides of the mandible become unlike, in one or more particulars and in greater or less degree. Sometimes the unlikeness of movement is very marked, as the essayist has pointed out.

But whether the movements of the two sides are like or unlike, they are usually more or less efficient, and whether more efficient or less, THEY ARE THE MOST EFFICIENT MOVEMENTS THE PATIENT IS LIKELY EVER TO HAVE, at least so far as my observation goes. And believing this, I regard it as of great importance to determine as exactly as possible what those movements are, and

to arrange the artificial teeth in such way as to preserve them and enable the patient to profit by their efficiency.

The reasons why I believe the movements established by the natural teeth to be the most efficient the patient will ever have are found in the fact that artificial dentures are rarely if ever sufficiently stable in position to be able to guide the jaw with the certainty and regularity necessary to the formation of new bony articulating surfaces and new muscular actions which shall approach in efficiency those which the natural teeth established. Even when only a few healthy natural teeth remain scattered about the mouth, they are much more firmly established than the best of artificial dentures. And, if they cannot prevent changes in the movements and in the bony formations and muscular actions, how much less can dentures mounted on movable bases prevent such changes, unless they are articulated in harmony with the established movements. I must say that this explanation of the causes occurred to me as a means of accounting for what I saw in practice. Experience with a large number of denture patients, many of whom have had from five to twenty sets of artificial dentures each, and many of whom keep these dentures in boxes rather than in the mouth, has convinced me that it is quite impossible for dentures to establish new and efficient masticatory movements, and that our success in making dentures with which the patients can masticate efficiently is absolutely conditioned upon the nearness with which they are arranged to facilitate the movements habitual to the patient. In cases where no intelligent attempt is made to preserve these movements, one of the most common effects of denture wearing is to destroy all definite and efficient movements of the mandible and indeed to lose all intelligent control over the movement so that the jaw flies about without control by the patient. It is hardly necessary to say that under these conditions the efficiency of mastication is reduced to a minimum.

The essayist has ascribed as fully as his time permitted, two very important improvements which have lately been made in articulators and which make possible the recording and reproduction of the patient's jaw movements. They are the Incisor Guide Incline and the movale rotation points. In concluding this discussion, it may be profitable to endeavor to make the importance and application of these two improvements clear.

An Incisor Guide Incline and the pin working on it are necessary in an articulator, because the upper jaw is there the movable part, and, unless it be supported in the anterior part during the lateral movements, it tends to fall upon the lower jaw, and cause wrong relations of the upper and lower anterior teeth. This is exactly the opposite to what occurs in a natural jaw, which tends to fall away from the upper teeth.

The influence of the Incisor Guide Incline on the positions of the teeth is much greater than is generally appreciated, and this influence once recognized makes this improvement an important part of an articulator. The following slide (Figure A) (from page 157 P. A. showing the influence of the Incisor Guide Incline) illustrates on the left (A) an Incisor Guide Incline which inclines 20° to the occlusal plane, associated with a forward condyle path of 45°. The position of the first molars just above the picture of the incline show that the inclination of the working bite to the occlusal plane is 10°. If now we look to the right, (B) we find an Incisor Guide Incline which slopes at an angle of 40° to the occlusal plane. The inclination of the working bite of the first molars is now 18°, tho the forward path of the condyle is inclined to the occlusal plane only 20°.

When, however, we compare the

depths of the working bites in the second molars, we see that the more steeply inclined the condyle path the more the buccal cusps of the upper second molar are elevated from the occlusal plane.

It is apparent, therefore, that the inclination of the Incisor Guide Incline exerts an important influence on the positions of the teeth back to and including the first molars, but the influence of the condyle movements is dominent in the second molars.

Dr. Campbell has shown us diagrams illustrating the influence of the different horizontal locations of the rotation point on the movement of the teeth. He has shown that the teeth move in one direction when the rotation points are located outside the condyles, and in quite another direction when the rotation points are inside the condyles, and has explained that wide variations in these locations often occur on different sides of the same mouth and necessitate different arrangements or grinding of the teeth.

I may be permitted to extend and emphasize what he has said by applying the differences in these movements to the upper and lower cuspid regions of the dentures, always one of the most difficult regions to articulate, and one where wrong contact frequently results in dislodgement of the dentures.

Figure B shows three horizontal locations of the rotation points, and the paths of the upper first bicuspid which are necessitated by these locations.

When the rotation point is at R 1 the upper first bicuspid follows the path with the same mark (R 1—show it). When it is at R m, the path is as shown with the same marking as the rotation point, R m. When it is at R a it follows the path marked R a.

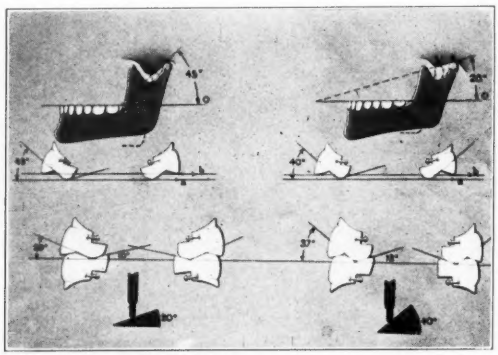


Figure A.

It is at once apparent that these paths are quite different in direction and that they may very possibly require different adaptations of the teeth.

A moment's study of the small figures on the right of the slide shows how true is the fact that the teeth require different arrangements to be able to follow these paths, and a very important detail, heretofore generally unnoticed, results therefrom. It is that the width of the upper six anterior artificial teeth, as related to the width of the six lowers is materially modified by these several locations of the rotation points.

When the rotation point is at R 1 the relations of the upper teeth must be as

shown in the figure marked "D" in which the tips of the upper cuspids come a little posterior to the distal angles of the lower cuspids. This permits the tip of the upper cuspids to pass in right relations to the lowers—a most important matter.

When the rotation point is at the location marked "R m" the relative widths of the upper and lower anteriors must be as shown in the figure marked "E," in

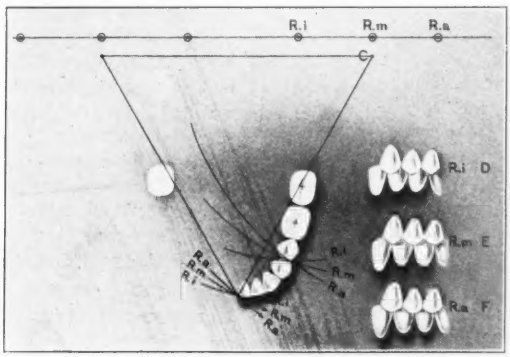


Figure B.

which the tips of the upper cuspids come just above the distal angle of the lower cuspids.

When the rotation point is at the location marked R a, the relative widths of the upper and lower anteriors must be as shown in the figures marked "F," where the tips of the upper cuspids are a little anterior to the distal angles of the lower cuspids.

These several considerations which I have been compelled to briefly touch upon, and others of equal importance which cannot be dealt with for lack of time, indicate the importance of knowing and reproducing the mandibular movements when arranging teeth for those patients who are sufficiently intelligent and appreciative to permit it. The essayist is doing much good, not only by his own clever exposition of the possibilities in his own practice, but in these interesting and instructive explanations to others.

DR. GEORGE HENRY WILSON, Cleveland, O.

This subject is certainly one that we are deeply interested in, it is a valuable one, and one method has been well presented today. The trouble is that it is a complicated subject, and it has not reached perfection as yet. We need to follow along with the different subjects as they come up. Every little while a journal will publish a new method of producing these results, and some point will be brought out; then a little later there will be something else.

Dr. Stephan spoke of Dr. Case bringing out an improvement in 1890. That same point was the foundation of the original anatomical articulator brought out by Dr. Evans in 1840, eighteen years before Dr. Bonwell brought out his triangle.

As far as the equilateral triangle is concerned, I think most of us have read the article by Dr. Frowne's, of Denver. in which he says in his experience at least ninety per cent of his cases are of scalene triangles, that is, with none of

the sides equal. What shall we do? One of the professors of prosthetic dentistry in one of our colleges says ninety per cent are scalene. Just before that article appeared I had the pleasure of making measurements of some three hundred mandibles in the Smithsonian Institution at Washington. I found but nineteen (6%) that were equilateral triangles; 187 (64%) cases of isosceles triangles, in which two sides were equal, in some cases the base and one side, but in a large majority the two sides were equal. Then the other one-third were scalene, no two sides equal. We know there are many influences changing the form of the face, the loss of the teeth and so on, so that one side is developed more than the other. The formation of the face is largely due to the development of the teeth. If a molar is lost on one side, we cannot expect that side to be developed as the other is. When we have an instrument that is based entirely upon an equilateral triangle, then we are wrong in depending upon it. There is the foundation. We study that, and then when there are variations we must develop those afterwards. How shall we get along with those different ideas? We go according to the scientific method as best we can, and then we refer to the never-failing articulator, the human anatomical articulator. The case must be taken to the mouth and adjusted there. The only trouble is in controlling the patient. But that is the only method we can really depend upon. So don't depend on mechanical devices altogether, but on what Nature has given us. (Applause.)

DR. PROTHERO, Chicago, Ill.

In the first place, I want to compliment the essayist on the very valuable paper presented. He has brought out many facts of value and many facts that are absolutely correct. There are some points about his paper with which I would like to take issue, if we had time, but I am not going to take up the time of the meeting for that. I want to second one point Dr. Wilson brought out, and that is with regard to the variation of the mandible and mandibular movements, and that we must test everything in the mouth. For many years we have been using articulators, or klenoid frames, the rotation centers of which were four inches apart, based upon the average distance between centers of the human condyles, and we still get very good results by using that, by afterward going back to the human apparatus and testing out the dentures on that appliance with carbon paper, grinding down the points of interference and making new contacts to conform to what we find in the particular individual. That is what Dr. Gysi has to do. He must finally test out by means of carbon paper, having the patient subject the mandible to lateral movements, and grind down the high points, then reproducing the points of contact.

I do not believe the Simplex Articular is a scientific appliance. The essayist says that Dr. Gysi has found 39 degrees between the two condyle paths, and he has found one of 45 or 48. Then how can an anatomical articulator with the condyle path set at 35 degrees prove a scientific instrument in that case? There must be a lot of "fixing," as Dr. Campbell says, done for such cases. We find variations in the condyle paths of our patients every day and variations in the rotation centers of the mandible, and there is no mechanical appliance made at present that will exactly reproduce the mandible movements, and if we know how to correct those variations as they come, we will be able to render our patients a class of service they have never been able to get in the past.

I have had only a limited experience in setting the lower molars outside of the upper molars, and reversing them when the molar is set outside and the normal mandibular movement is outward. When that happens, that throws

the teeth in an incorrect relation to either receive or crush, and that movement is abnormal, and I don't believe it will answer in the normal case. Judging from general anatomical movements, that doesn't appeal to me. The extent of bodily lateral movement, side movement of the mandible is brought out very prominently in the Gysi system. While there is no doubt but there is a bodily lateral movement, the extent of that side movement, and the slight movement necessary to bring the teeth in closer relation to each other is so slight as to be almost imperceptible, less than ½ mm. in the average case, the side movement, according to the measurements which I have made. When the mandible is swung way to one side, then you get a much greater movement, but I have registered a number of cases where there is no actual bodily side movement. I can swing my own mandible almost an eighth of an inch, but I find in studying the movements of my jaw in mastication of meats, that I do not use the side movement to any great extent, merely a protrusive movement on one side, the other side remaining practically at rest. The rotation centers in my own mandibles are not exactly on the heads of the condyles. They are, in certain cases. Some lie outside and some inside, and there is no reason why they shouldn't lie in the condyle itself. There are cases where the condyle itself is the true center in the movement. I do not believe there is a better and I do not believe any appliance constructed at the present time that is as scientific in its movements or capable of producing as good results, if all the details are correctly followed and accurately followed, as the Gysi Adaptable appliance. If it is studied and the instructions carried out carefully, that is very good, but that is not infallible. I do not sanction the use of the Gysi Simplex, either from the standpoint of the teacher or for use in the profession in general. (Applause.)

DR. CAMPBELL: Having known Dr. Prothero, of Illinois, for several years, following closely his teachings, I am, of course, familiar with his instrument for securing the occlusal plane. I am constrained to believe that in most instances the occlusal plane may be secured in less time with the knife and ruler than would be required to mount Dr. Prothero's instrument.

Among the many things noteworthy of the men who are inventing articulators, or making new appliances for the anatomical occlusion of the teeth, is the fact that the more correct they are in the reproduction of mandibular movements the more like the Gysi Adaptable Articulator they make their new mechanism. This is particularly gratifying to the Gysi adherance and enthusiasts.

The lateral path was mentioned by Dr. Prothero and the movement of one-half mm. That is not the condition found in my own mouth and in observing the masticatory movements of my patients. I say three mm. or the width of a lower incisor.

The condyle may follow paths which, altho irregular, are nevertheless habitual movements. The last few teeth before disappearing were enough to establish movements differing widely from what might be regarded as normal. The Gysi Measuring Instruments simply copy these movements, regular or irregular, and enable the prosthetist to arrange the teeth on the Adaptable Articulator in conformity with the habitual movements.

I regard it as a high honor to present my paper in the presence of Dr. Wilson and Dr. Prothero. To me they have been "daddies" in Prosthetic Dentistry and when in doubt I shall continue to look to them for help.

Some one said that the Simplex is not a scientific instrument. I agree with

him. Still, with the exception of the Gysi Adaptable, I regard the Simplex as the best. The person who raised this objection based it upon the old belief that the rotation point and tempero-maxillary joint had a common center. We must insist that that belief is no longer tenable. The theoretical points or rotation in the actual masticatory movements sometimes fall as much as an inch and a half outside of the jaw. On the Articulator we must give all points tangible locations. Whether the triangle, Bonwill's equilateral or anybody's scalene, isosceles, or any other triangle, we get the rotation points, reproduce them on the Adaptable and obtain dentures which may be placed in the mouth without gloomy forbodings of subsequent alterations.

TECHNIC FOR MAKING IMPRESSIONS AND MODELS FOR THE CONSTRUCTION OF ARTIFICIAL DENTURES.

By William A. Giffen, D. D. S., Detroit, Mich.

(Read before the National Dental Association.)

I FULLY appreciate the honor conferred on me by extending this privilege of appearing before you to discuss, what to my mind, is the most important subject in the whole field of dentistry, viz., the basic principles involved in the construction of artificial dentures.

I have not a great deal that is original to offer, but have arranged in detail the best points from the various methods employed by other prosthodontists which, in my judgment and in my hands, after considerable clinical experience, produce the most perfect results into one complete system which I shall present for your consideration.

To get the most perfect results in artificial dentures there are three steps which require the same judgment and accuracy of manipulation as that exercised for success in inlay or root canal work, and carelessness in any one of the three steps will certainly insure failure to a greater or lesser extent.

The first of these three principal steps is a correct impression; the second, a perfect model that will remain unchanged in shape until the denture has been vulcanized and cooled; the third, a proper arrangement of the teeth.

No man should expect to make artificial dentures that are practically successful until he has mastered a good technic for these three steps.

The most important part of the systematized technic which we are going to discuss is the Greene Method of Adapting a Plastic Matrix to obtain a correct impression of the surfaces to be fitted. Consequently, we shall use the Greene inventions or devices for the purpose of making the work as simple and accurate as possible.

Preliminary impressions and models of each should always be made. It takes but a few minutes of time which will be saved or made up later. It gives an opportunity to judge the temperament, also the attidude of the patient towards you, which is very important, especially with referred patients. It also demonstrates to the patient that you are giving the case careful consideration and enables you to charge a reasonable fee for your advice. From the models you can estimate more accurately the difficulties to be contended with and also fit trays to the preliminary models which will require the minimum amount of impression material to make a correct impression.

Preliminary Upper Impressions:—Select a Greene Method Tray which will easily slip over the ridge, place enough perfection impression material in the tray, moulding it over the inside so the center will be heaped up and a little excess around the rim of the tray, place it in the mouth and gently press it to

position, and with the finger burnish the pressed out excess up under the cheeks and lip. Take a small cold gauze sponge, place it against lingual surface of tray to chill that portion of the impression, hold it in position and have the patient work the muscles of the cheeks and lip over the soft rim of the impression to show approximately the line of the muscular attachment to the maxilla.

No. 1—Greene Method Impression Trays.

The preliminary models are made by selecting from the Greene ready-made non-changeable approximate metal models an upper metal model that will approximately fit the upper impression, and a lower metal model that will approximately fit the lower impression. A sufficient amount of plaster is now mixed

No. 2—Preliminary Impressions—upper and lower.

The preliminary lower impression should be made in the same way except that the inside rim will be trimmed approximately by sticking the tongue out of the mouth as far as possible, thus pressing the muscles and the tissues of the floor of the mouth against the plastic inner rim of the impression to cover the inside of each impression, also the ridge of each metal model. The upper metal model is then gently pressed to position in the upper impression and the lower metal model in the lower impression, and the excess of plaster

which has been squeezed out around the edges, wiped off. When the plaster has become hard the impressions are stripped off and the models trimmed—being careful to leave the shelf portion which clearly defines the edge of the impression.

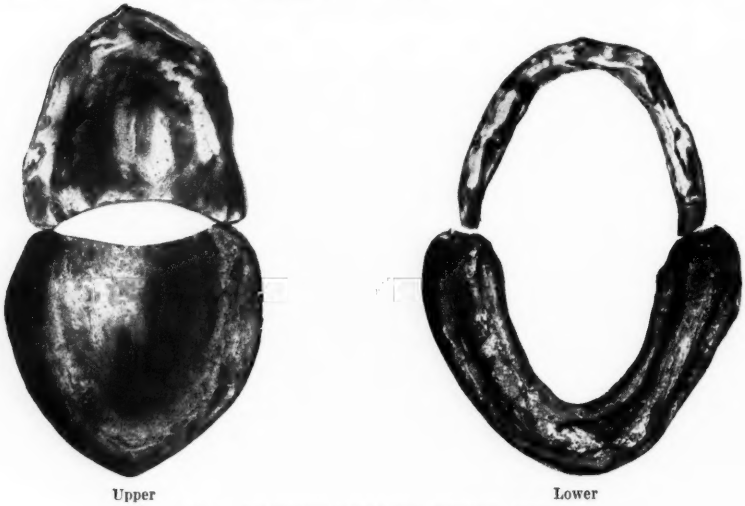
No. 3—Greene ready-made non-changeable Approximate Metal Model—upper.

You now have models which are about 95 per cent metal with a thin film of plaster over them. No model can be made that is less changeable and they will not warp or break and will stand a great deal of abuse. There is no possibility of squeezing them out of shape by careless packing, flasking or vulcanizing. Also by adding 25 per cent Portland cement to the plaster any kind of a metal base plate can be swagged over them perfectly in a rubber block swager. The writer would also suggest at this point that the only safe way to make a cast metal bast plate is to make two models for each case, cast the bast plate on one model and then swage it over the other model to correct any warping or change in shape which may have taken place during crystallization of the metal.

Trays are now made for making correctable impressions by swagging Ash & Sons No. 7 soft metal over the models in a rubber block swager. The trays should be trimmed a quarter of an inch shorter than the finished plate should be, and the edge or rim only deep enough to prevent slipping. The edges of the trays are opened, while on the models, about one-eighth of an inch, with a knife, and then taken off and a beading traced along the edge with a stick of perfection impression material, then a wafer of the same material is warmed and spread over the inner surface of the trays with

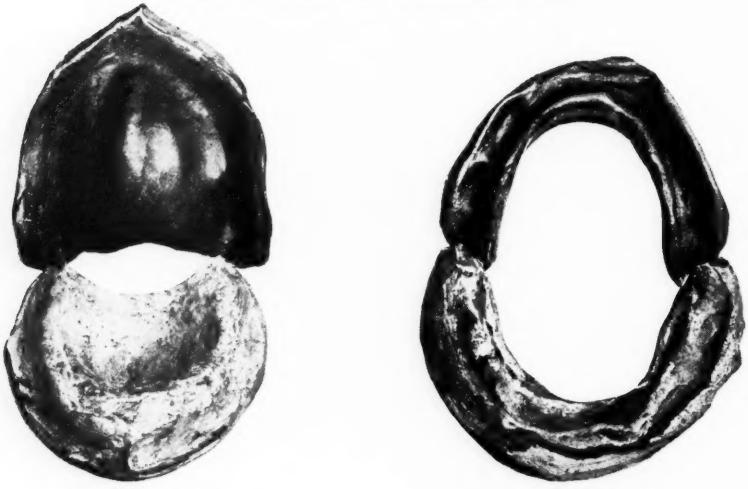
No. 4—Cross section of Model before separating, showing, **first**, metal tray; **second**, impression material; **third**, layer of plaster; **fourth**, approximate metal model.

the excess folded along the edges of the trays. The models are now rubbed with vaseline or cocoa butter so the impression material will not stick to them, the impression material in the tray is now softened just enough so it can be changed in shape and the excess burnished up to muscle line on models with the fingers.



Upper Lower

No. 5—Preliminary Models and Individual Trays.



Upper Lower

No. 6—Correctable Impressions made on Preliminary Models.

All this work can be done by an assistant and you are ready for the patient with an approximate correctable impres-

sion which can be transformed into an accurately fitting impression which will be the correct height and length the denture should be. It has about an equal strain on the hard and soft parts and relief without a leak for motion of muscles.

First Step:—Take correctable impression and pass back and forth over the flame from small burner to soften the surface to a sufficient flowing consistency, not quite hot enough to burn your fingers at a test touch. Always wet your fingers with warm water; explain to your patient that it is not hot enough to burn.

Place in position in the mouth and push up lightly and if the roof of the mouth is deep, work it slightly forward. When properly seated take a small damp gauze sponge off cracked ice and place on lingual surface of tray holding it in place for about one-half a minute; in the meantime straighten up the impression above the edge of the tray all around, but not tightly against the gums, and while the rim of material is still soft, have the patient work it down by lip and cheek motions. This gives you the approximate height of impression and with a fresh cold sponge cool the rim. Now let go of the tray and if the impression stays in place without any muscular movement to dislodge it, you know it fits the roof and bearing surface of the ridge. This test rarely fails; if it does repeat.

Second Step:—When the rim has been trimmed approximately as to height, warm the rim slightly on the outside and with a sharp knife shave off until the rim is about twice as thick as the finished plate rim should be. Next trim the distal edge of plate, leaving it about one-eighth of an inch too long.

The finished denture should be long enough to reach unto the soft tissues, but not far enough to interfere with muscular action in swallowing. Warm this thin projecting edge until it is quite flexible, place the impression in the mouth quickly and have the patient swallow once or twice.

No. 7—Tested Impressions.

Take the impression out and find the distal edge turned down as far as the moving parts have moved; chill in cold water and trim off to where it turns down. Repeat and trim again if necessary This valve pressure fit should extend clear around the impression behind the tuberosities. If at any point the rim is short, trace on as much with a stick of material as is necessary.

Third Step:—Retest the roof and ridge by pouring a small stream of hot water into the impression, allowing it to run

off at the heels. The rim must not be softened, but the center should be as soft as possible without burning the patient. Quickly insert it and immediately press it lightly and quickly. Repeat as often as necessary until the impression will stand a roof fit test, i. e., hang there snugly with no muscular motion to loosen it.

Frequently this has to be repeated and particular points especially warmed where attachments of muscles are stringy. Persistence is sure to bring accurate results.

Unless individual muscle attachments require special attention you can accurately trim the impression rim in a few minutes. Continue to trim until the natural movements of cheek and lips fail to cut any deeper into the softened edge.

No. 8—Final Models with metal try-in base plates.

Fourth Step:—Correct rims to muscles.

This is to get the exact height of the plate rim everywhere and to get relief for the muscles without a leak. Warm the edge of the rim slightly and pinch it up, making it a little too high and thin at the top; now warm quite soft to a very shallow depth, place in the mouth and with quick, vigorous movements of lip and cheeks work it down to proper height to fit moving muscles.

I usually do this one side at a time until every tissue hard and soft has cut its way into thin very soft rim (over a hard under stratem).

Fifth Step:—In conforming the rim to the buccal and labial surfaces of the ridge gentle pressure must be used on those soft or compressible areas as those surfaces are always harder in some places than in others. The work must be done very carefully as it is of vast importance in many cases.

Slightly warm the rim of impression extending beyond the edge of metal tray on the left side by passing it over flame slowly warming it thru from outer side until it reaches about the softness

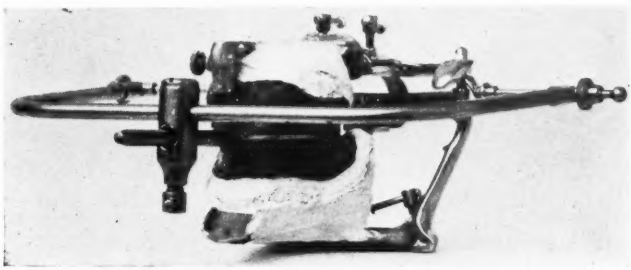
of the palm of your hand, slip it into place in the mouth and as quickly place a cold cotton roll between the cheek and softened rim, hold the impression in position with the right hand and press

No. 9—Metal Try-in plates with wax rims built on.

gently on outside of left cheek with left thumb and hold it for about half a minute until the cold roll chills the impression material to prevent rebounding when pressure is removed. The rim is conformed to the labial and opposite buccal

index finger of right hand gently burnish around the tuberosities.

Sixth Step:—Conforming the distal edge in impression, the most important point for adjustment in the entire operation, slightly warm the edge projecting beyond edge of metal tray, place in position in the mouth and instruct patient to press it up gently but firmly at the back part with the tongue and hold it



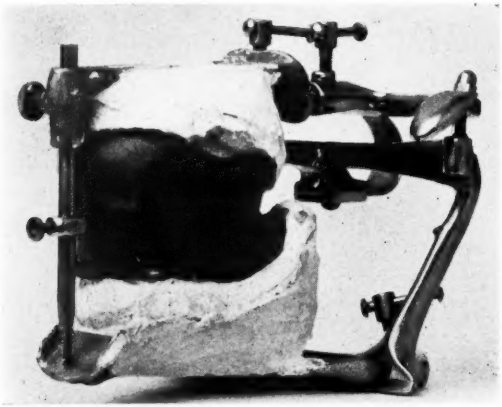
No. 10—The Bite with articulator representing patient.

surface in the same way. In easy cases where there is a big mouth and thin lips both sides and the front can be conformed at the same time. Next gently warm the heel corners, replace in the mouth and with cold gauze covering the

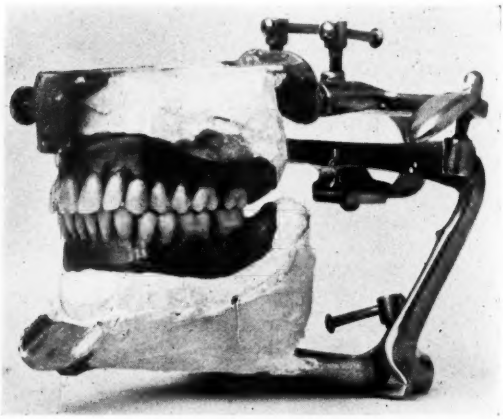
for a minute, then finish and cool with finger pressure.

In actual practice as many of these details may be united as the case and ability of operator will permit. However, there is seldom any necessity of

being in a hurry as it really is not objectionable to the patient, and in most cases the patient is as much interested as the operator. I would add that few patients will ever feel satisfied that their impressions are properly made subsequently unless the same care is used.



No. 11—Try-in or Bite Plates transferred to articulator.



No. 12—Showing the teeth placed in wax on try-in plates ready for a try-in for final adjustment.

Final Test:—The finished impression is placed in the mouth and the patient instructed to try and loosen by action of muscles of lips and cheeks or swallowing, or biting on finger. If none of these movements throw down the impression a plate properly made from it will not be loosened. However, if none of these movements loosen the impression, do not hesitate to readjust the part of the impression where loosening first takes

place. If you do not correct it at this time the alternative will probably be to make your denture "over."

Lower Dentures:—The first requirement is a preliminary impression and model upon which swage a tray that will fit the crest of the ridge and about one-quarter of an inch shorter than the denture should be. The same principles are following as in the upper impressions.

The outer rim and heels are muscle trimmed by swallowing and lip and cheek movement. In trimming the lingual with the soft tissues of the floor of the mouth the edge must be warmed until it is very soft and the instant it is slipped into the mouth the patient must bite down on the rests, swallow and move the tongue all over the roof of the mouth as vigorously as possible. The impression is then cooled and the excess, which has turned up, trimmed off with a knife and the operation repeated until no more will turn up.

Now conform to lingual surface of ridge by warming until it is quite flexible and have patient press steadily with the tongue for a minute and finish with cold finger pressure, but don't bear hard nor press downward when retouching.

Test for Fit:—The impression is thoroly chilled, placed in the mouth, pressed down with index fingers for about a minute; if it sticks fast or even if it comes loose with a little noise, its O. K. If not, correct where it is strained up first. The denture made from such an impression will always test better after it has become properly seated.

Final models are now made in the tested impressions exactly as the preliminary models were made.

The impressions pulled off and the metal trays cleaned and re-swaged to the models and are now known as bite plates upon which build rims of base plates wax. The metal bite plates have many advantages. They fit as accurately as the finished plate will fit; and heat of the mouth will not cause them to soften and bend out of shape; they will stay in position, they require the minimum amount of wax to take the bite; the patient will not object or become impatient while you are building on or trimming for feature restoration.

When the bite has been taken and the face bow attached they are taken out of the mouth placed on the models and the models attached to articulator. After the condyle path has been established and medium and lip line marked they are ready for placing the teeth, simply cutting out the wax rims in sections as the teeth are set up. The metal bite plates take the place of the wax base plates. This is also of great advantage; they protect the models from getting daubed up with hot wax; are exactly the same thickness the roof of the finished plate is to be, and the surface shows any ridges or irregularities the roof of the mouth may have. Consequently the plate will have a more natural feeling to the tongue. The plate will require the minimum amount of polishing and will have the maximum amount of strength in the roof of the plate with the minimum amount of rubber.

Discussion.

Dr. George H. Wilson, Cleveland, Ohio.

I am sorry the other men are not here to present this subject, because we should expect that the regular discussers would speak in favor of the method, and then it is nice to have some one come in and present the other side. I wish, first, to compliment the essayist upon his essay and upon his presentation of his work. You can see that he is a clever, fine workman, and no matter what method he will pursue the work will be nicely done. Those of us who know the essayist know that that is the nature of the man. I wish to call your attention to the other side of the modeling compound impression. We are likely to be deceived. I know of no material so de-

ceptive as modeling compound. The one great reason it is deceptive is because it doesn't break, and that is the very reason why men will insist on using it. They are afraid of the plaster because it breaks. You think you can get a very perfect impression with modeling compound because it adheres tightly. That may be a deception. There are only two ways by which an impression can be made to stay in; one is by atmospheric pressure and the other is by adhesion or contact. If there is perfect adaptation around the periphery of the plate, and a space, then we simply have a large vacuum chamber and, of course, have strong adhesion. After a time that space must be filled with the tissues, and then we only have adhesion by contact. So you see that strong adhesion you have at first is a deception.

In regard to the plaster impression, I believe I can make a plaster impression stay in the mouth tighter than any modeling compound impression that can be placed there, and the tighter and closer it remains the stronger the evidence that the plaster (?) impression is a poor one and that it is a method that should be considered malpractice. The strong impression of a plaster impression is an evidence it has been left there too long and is a poor impression. If it is a good impression, take it out at the proper time and there will be just moderate retention. Why should we go thru all this rigmarole to take impressions of the simplest form we have, comparatively a shallow mouth, a good patient, and yet see the fussing it takes. I know of men, experts in handling modeling compounds, who spend one or two hours taking an impression of a difficult case. Yet it has this advantage, that if we fail for any known reason we can take the impression and build it up with modeling compounds, as you see this was done, and you can test it out. There is an advantage in it, but it seems to me as scientific men we should diagnose our case and take an impression designed for that special purpose rather than cut any try. For that reason I desire to caution you against being carried away by this prevailing idea of this modeling compound impression and giving up your plaster impression, which I believe my good friend will eventually come back to. I know he is enthusiastic over this at the present time, because it is a study, and he delights in study, but I think he will get back to solid earth after a time. I do not want any one to think this is a condemnation of the man, or really of the method; it is only to present the other side of the method and to caution you. (Applause.)

DR. GIFFIN: The hour is rather late to start a discussion with Dr. Wilson but in reply to the Doctor's joke that I may go back to plaster as a material for making impressions, will say that I am so gratified with the results I am obtaining with the modeling compound that I cannot imagine any reason why I should ever think of using plaster for edentulous cases, and I believe I can make as good an impression with plaster as plaster will make, also that I am perfectly familiar with Dr. Wilson's plaster technic, which we all know is the last word so far as the manipulation of plaster is concerned.

You overcome any objections the patient may have with the technic I have demonstrated. They are interested in it because you show them why you are doing this, that and the other thing, and it is a facinating technic for the operator as well, as he knows if he is careful of the detail all guess work will be eliminated.

If you are going to develop a system for doing this work why not develop a system from which you can obtain the most perfect results?

Dr. Wilson made the statement that compound is deceptive because it is flexible and does not break readily at body

temperature. The doctor is perfectly right if you use it at body temperature, but I have endeavored to show you a suitable technic so you may chill the compound far below body temperature, which I assure you is very simple and in fact is the great secret in using this material effectively. I am satisfied from simple tests which I have made that practically no change takes place in Detroit modeling compound after it is chilled.

I think time spent in making an impression from which an accurate model can be made, is a good investment for both patient and operator.

If you are making a coping for a broken down root or a porcelain jacket crown you will stick to it until you have your matrix adapted to it as perfectly as possible, so I believe the adaptation of a matrix to a surface which is to support a denture is every bit as important. (Applause.)

THE RESEARCH DEPARTMENT.

CONDUCTED BY

The Research Institute of the National Dental Association

All Communications for this Department Should be Addressed to the President and (Acting) Managing Director, Weston A. Price, M. S., D. D. S., Research Institute of the National Dental Association, Cleveland, Ohio.

THE OPENING OF THE RESEARCH INSTITUTE OF THE NATIONAL DENTAL ASSOCIATION.

By Otto U. King, D. D. S., General Secretary, Huntington, Indiana.

THE Research Institute of the National Dental Association was formally opened on Monday evening, February the seventh, 1916. The permanent establishment of a home for our Research Institute marks a new era in scientific dentistry. Dentistry has been making history during the last decade; in the perfection of its great organization; its plans for a better educated dentist; the publication of our own Journal; and now in the opening of this Research Institute, the laying of a permanent foundation for a more scientific profession. The dental profession will now have its own research workers, giving their life to special subjects, under the control and guidance of the dental profession. Dr. Mayo said in his address: "There is no question but what this is the most auspicious moment that the dental profession has ever seen."

It is unfortunate that a larger number were not able to enjoy with us, the splendid occasion of the opening of the Institute, for it was a most enjoyable and enthusiastic occasion. Two hundred and seventeen invited guests were served at the banquet, which was followed by a program of such stirring interest, that the enthusiasm was ever increasing to the time of adjournment. The officers and trustees of the National Dental Association present, were most enthusiastic in their expressions of praise and gratification, and the guests from Allied Scientific and Educational Institutions were most profused in their expressions of appreciation, encouragement and congratulation. The important place the Research Institute occupies in the minds of learned and scientific men, as well as great surgeons and others, was demonstrated by those who accepted invitations to appear on the opening program.

PROGRAM.

Presiding,

Dr. Weston A. Price, President.

Invocation,

Dr. Charles F. Thwing, Cleveland, O.
President of Western Reserve University.

Greetings and Purpose,

Dr. Thomas P. Hinman, Atlanta, Ga.
President of the National Dental Association.
Vice-President of the Research Institute.

The National Profession—

Response and Greetings,

Dr. Harvey J. Burkhart, Rochester, N. Y.
Director of the Eastman Dental Infirmary.
President of the Board of Trustees of the National Dental Association.

The Local Profession—

Response and Greetings,

Dr. Edward H. Shannon, City.
President of the Cleveland Dental Society.

Educational Institutions—

Response and Greetings,

Dr. C. S. Howe, Cleveland, O.
President of Case School of Applied Science.

Introduction,

Dr. George W. Crile, Surgeon, Cleveland, O.
"Human Progress and Scientific Research."

Address,

Dr. Charles H. Mayo, Rochester, Minnesota.
President of the Congress of Clinical Surgeons of North America.
"Dental Research, Its Place in Preventive Medicine."

Address,

Dr. Thomas B. Hartzell, Minneapolis, Minn.
Director of Special Researches for the Research Institute of the National Dental Association.
"Some Evidences of the Importance of the Dental Path as a Source of Serious Localized and General Infections."

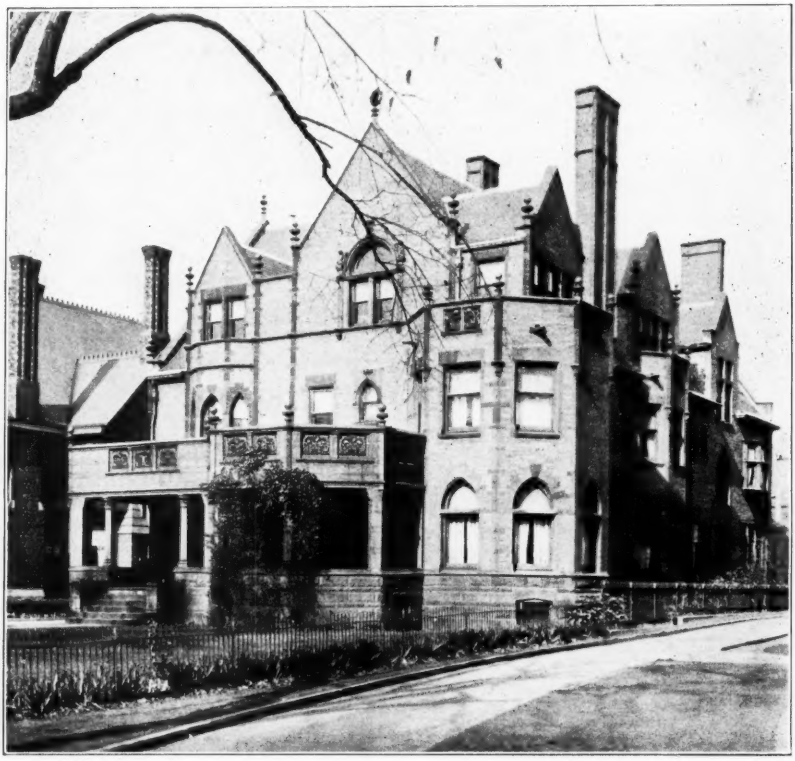
General Introductions.

Inspection of Buildings.

The occasion of the opening was made very notable by the fact that leading men from local, national, educational and philanthropic institutions were present. These included, beside our distinguished surgeons on the program—Dr. Charles H. Mayo, of Rochester, Minnesota, and Dr. George W. Crile, of Cleveland—the President of our two local Universities—Dr. Charles F. Thwing of Western Reserve University and Dr. Charles S. Howe, of Case School of Applied Science; Dr. Percy Howe, directing researches in and representing the Forsyth Dental Infirmary for Children, Boston; Dr. Harvey J. Burkhart, Director of and representing the Eastman Dental Infirmary, Rochester, N. Y.; Dr. W. W. Smith, of West Lynn, Mass.; Dr. Marcus L. Ward and Dr. Russell W. Bunting, directing researches in and representing the University of Michigan; Dr. Thomas B. Hartzell, directing researches in and representing the University of Minnesota; Dr. Thomas P. Hinman, President of the National Dental Association, officiating in that capacity; Dr. Otto U. King, Secretary of the National Dental Association and Editor of the Journal of the National Dental Association, also officiating in that capacity; Dr. W. G. Leutner, Dean of the Adelbert College of the Western Reserve University; Dr. D. C. Miller, head of the Department of Physics of Case School of Applied Science; Dr. A. W. Smith, head of the De-

partment of Chemistry of Case School of Applied Science. Dr. George N. Stewart, Director of the Cushing Labratory of Medical Research; Dr. David Maurice, of the Research Institute and some distinguished representatives of large business and legal concerns and prominent citizens. The local dental profession

Figure 1.

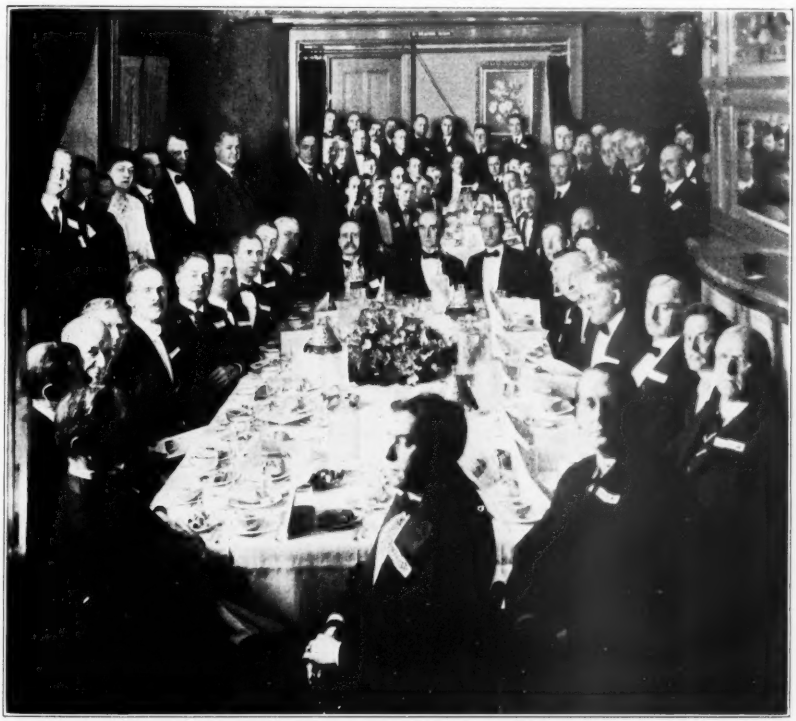


THE RESEARCH INSTITUTE OF THE NATIONAL DENTAL ASSOCIATION.
MAIN BUILDING.
8803 Euclid Avenue, Cleveland, Ohio.

directing special researches on Thyroil Goiter problems in the Cushing Labratory for Medical Research. Superintendents, Officers and Trustees of several of the large hospitals of the city, many distinguished physicians and surgeons of Cleveland and Ohio and many prominent philanthropists; the Trustees was magnificently represented, for the Cleveland Dental Society gave up its regular meeting in order to accept the invitation of the Trustees of the Research Institute to join with them in the opening of the Institution. About 140 of its members attended and a large committee from the Cleveland Dental Society

assisted the Trustees in receiving the guests and showing them thru the building. The more than generous support of the Cleveland dental profession in supporting the work of the National Dental Association in the matter of providing money for researches, in which they have led the entire country, has been worthily duplicated in their magnanimous support of the Building Fund, for they immediately, when it was announced that the headquarters of the Research Institute of the National Dental Association would probably be located in Cleveland, undertook to contribute $5,000 themselves toward the Building Fund. We are advised, just as we go to press, that they have already slightly exceeded this amount in cash and subscriptions. In addition to this, various study clubs from among the Cleveland dentists have expressed a desire to make special contributions of apparatus. The co-operation and support from the members of the Cleveland Dental Society is practically unanimous and enthusiastic, as is that of the entire profession of the State of Ohio, as illustrated by the fact that the Ohio State Dental Association, at its December

Figure 2.



GUEST TABLE AT THE OPENING BANQUET.

meeting, voted four thousand dollars from its Treasury to the Building Fund. It should be a matter of profound pride to the entire dental profession that, within a few months after the Trustees of the Research Institute decided to purchase this property, practically two-fifths of the cost of the property has been provided in cash and pledges, a large proportion of which has come from the dental profession.

One of the significant and beautiful things, in connection with the opening of the Research Institute, has been that the furnishings have been almost entirely contributed by general and special stores and manufacturing concerns. These have been referred to by the President in his opening remarks.

The speakers were all filled with the same spirit of enthusiasm and earnestness, that this was one of the most important events in the history of the dental profession. Dr. Mayo referred to it as "There is no question but what this is the most auspicious moment that the dental profession has ever seen." The comment of the guests, both lay, medical and dental, was that this is no longer a dental problem but a municipal and national problem and that all interests must combine to adequately support it and make possible for humanity that for which the work has been founded. The

Figure 3.

OFFICE.

enthusiasm of the lay members present was so great that different ones made the statement that with such enthusiasm and endorsement as the dental and medical professions are apparently giving this work, there can be no question about the ability to adequately endow it.

The purchase of the Wellman mansion as a home for the Research Institute of the National Dental Association is, from a business standpoint, almost equivalent to receiving the building as a gift, since this property is just in the transition stage between high-class residence and high class business property. This encroachment of business is condemning residences of all grades to scrap, since they are not usually available for adaptation to big business. The land appraisal value of the lot ranges from forty-five to forty-eight thousand dollars. The land with the two buildings cost fifty thousand dollars, with a contribution of $2,500 toward the Building Fund from Mr. Wellman. The buildings are quite as good as new, having been erected only sixteen years ago, at which time they cost approximately $75,000, when the cost of building and of materials was much less than at present. Being an eleemosynary institution it is free from taxation, which item in the past has been over one thousand dollars a year. Property values in this vicinity

Figure 4.

CLINICAL STUDY.

have been increasing very rapidly the last decade. The buildings around it are all of the same high class. The lot is 75½ feet by 250 feet and the building is back one hundred feet from the street, which gives ample space for later enlargements if desired.

ecutive and Correspondence; 14, Special Research; 15, Supply Room; 16, Pathological Research, Sectioning and Staining;17, Metallurgical Research; 18, Bacteriological Research.

Third Floor—Room 19, Main Lecture Hall; 20, Photography, Developing and

Figure 5.

BACTERIOLOGY, STERILIZATION AND MEDIA MAKING.

DIRECTORY OF BUILDING.

Main Building.

First Floor—Room 1, Reception Room; 2, Office and Secretaries; 3, Board of Trustees and Advisory Board; 4, Library, current and reference; 5, Abstracting, private study room for research workers; 6, Reading Room; 7, Stock Room; 8, Refrigeration; 9, Sterilization, also Centrifuging, Media Making, General Kitchen; 10, Incubation.

Second Floor—Room 11, Special Reference Library; 12, Clinical Study and Operatory; 13, Managing Director, Ex-

Printing, Microphotography, Motion Picture Microphotography; 21, Storage; 22, 23 and 24, Curator's Quarters.

Basement—Room 25, Animal Surgery; 26, Animal Room; 27, Overflow Reference Library; 228, Metallographic Research, High Temperature Electric Furnaces, Specially Constructed Variable Transformer, Testing Machines for Tensile Strength, Elasticity, Hardness, etc., Optical Equipment for Crystallography, Assaying, Weighing, etc., Lathe and Machine Shop; 29, Laundry; 30, Furnaces, hot water, air pump, etc.

(Note: All floors are connected by hoist, and nearly all rooms have running hot and cold water.)

Second Building.

First Floor—Adaptable to Auditorium Purposes.

Second Floor — Special Research Rooms.

Basement—Animal Rooms.

how adaptable many of these rooms are to the needs of the Institute. The office is large and spacious and easily accessible to all parts of the building and to the two main entrances. See figure No. 3. The kitchen, with its large ranges and sinks, is ideally arranged for adaptation for the part of the bacteriological work involved in sterilization, media

Figure 6.

PHOTOGRAPHY AND PHOTOMICROGRAPHY.
(Has Excellent Dark Room Adjoining).

The rooms are very large and light. Their size can be judged from the fact that the 217 guests at the opening, were seated in three connecting rooms, and were all able to see and hear the speakers and see the stereopticon illustrations. There are about thirty rooms in the two buildings, all of which will adapt splendidly to our needs. Hot and cold water, wash rooms, etc., are liberally distributed on all floors and in many of the rooms. The accompanying illustrations, showing interior views of several of the rooms, indicate very well

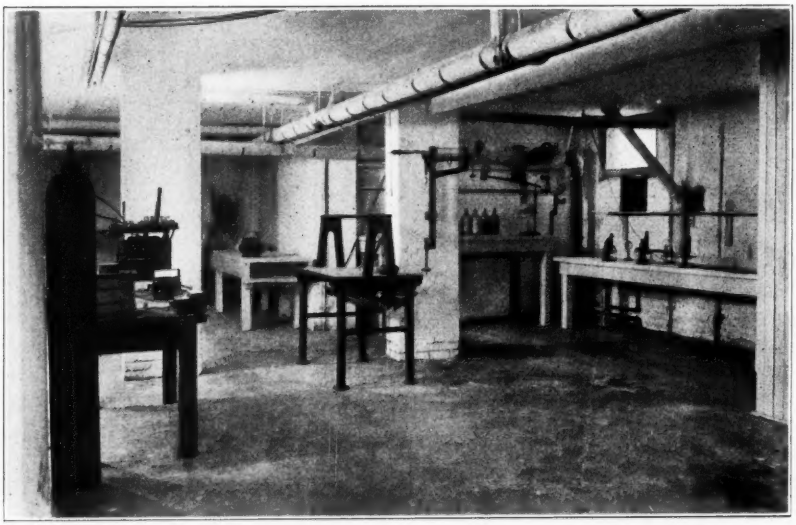
making, general incubation, centrifuging. This is shown in figure No. 5. Adjoining this room is a well lighted room and suitable for bacteriological examination, culturing, incubating, plating, etc. The home is provided with a large spacious library on the first floor, which will be used for the reference library of the Institute. A large room has been refinished just beneath this as an overflow library, from which journals will be sent, on application, to the members of the profession. The large dining room of

the home is used as a reading room. The den is used as an abstracting room.

The second floor is devoted to special research rooms and a clinical study, which is shown in figure No. 4. We are pleased to announce that the furnishings for this room are almost entirely contributed gratis by dental manufacturers. The splendid photographic room, with a thoroly equipped dark room already in the building when it was purchased—having been built in when the building was constructed, is shown in figure No. 6. The balance of the third floor will be used for research rooms and curator's quarters. Besides the sub-library referred to in the basement, a large room has been made into a Metallurgical Department, which is shown in figure No. 7. This room has a power shafting, motor driven, which runs various machines and grinding units. It also has, adjoining it, a photographic room thoroly equipped and a weighing room and electric furnaces, some of which are shown in the illustration and are capable of temperatures far above the melting point of platinum.

The large barn, built of the same beautiful tapestry brick, has three stories and is as well constructed as many homes. It will adapt itself to animal quarters in the basement and study rooms on the second floor. The first floor could readily be adapted as a spacious auditorium.

Figure 7.



METALLOGRAPHY.

The Executive Committee of the Research Institute of the National Dental Association report that, "in the few months since the purchase of the property to be the headquarters for the research work of the National Dental Association, there has been secured, in cash and pledges, over $22,000 of the $50,000 required to purchase the property. This has come from 364 subscribers, four State Societies and the Cleveland Dental Society. Incidentally, the

securing of the headquarters has been a great stimulation to the research movement, and to the interest and appreciation of the medical profession, as well as of the public at large. This was well illustrated last week at the Tri-State Dental Convention at Kansas City, of Kansas, Oklahoma and Missouri, which states had already contributed over $4,000 to the Research Fund, and gave additional new subscriptions for $6,755, of which $1,700 was for the Building Fund. This included $300 from the Kansas State Dental Association Treasury, $250 from the Missouri and $100 from the Oklahoma. We realized that a great many of the good friends of the research work who will make contributions to this Building Fund have not done so as yet. We hope they will before the National meeting.

The Trustees are planning to start a campaign to raise a large endowment fund to support all the various researches, both under grants and in the Institute, but before doing this the building should, if possible, be all provided for, and they greatly desire that each State Society will assist by contributing from its Treasury toward this Building Fund. A few hundred dollars from each will very greatly assist the work. The Ohio Society contributed $4,000 from its Treasury."

Every dentist has a certain well defined responsibility relative to the success of this great scientific Research Institute. No dentist who has the good of his profession at heart, will refuse to financially assist in the permanent endowment of this institution. This institution demands the loyal co-operation of every member, every component society, every state society, and every officer of the National Dental Association, to the end that an endowment which will insure the success of the Research Institute is raised.

Carved on the mantle, in the Library of this beautiful Research Institute are these words: "Ignorance is the curse of God, knowledge the wings wherewith we fly to health."

The mission of the Research Institute is to dispel ignorance, by raising the standard of dentistry to a higher plane of efficiency. In this great battle against ignorance, every dentist is enlisted to assume his share of the moral and financial responsibility. **In "the most auspicious moment that the dental profession has ever seen" can the profession and humanity depend on you?**

Carved on the mantel, in the Library of this beautiful Research Institute, are these words: "Ignorance is the curse of God, knowledge the wings wherewith we fly to health."

ADDRESSES AT OPENING OF THE RESEARCH INSTITUTE OF THE NATIONAL DENTAL ASSOCIATION,

8803 Euclid Avenue, Cleveland, Ohio,

FEBRUARY 7, 1916.

THE meeting was called to order after the dinner, by Dr. Weston A. Price, President of the Institute, who presided.

PRESIDENT PRICE. It has been said many times during the developmental work of the Research Department that it is coming at the psychological moment. Some one asked me what that was. I said it was simply an expression of the plan of Providence. I think it is entirely fitting that we should begin the work of this institute with a divine invocation. We had expected that Dr. Thwing would be able to make that for us, but on account of another important duty he was required to leave earlier than he desired to, and Dr. George Hugh Birney will make the invocation prayer.

DR. BIRNEY. Almighty God, our Heavenly Father, the Giver of life, the Giver of every good and perfect gift, we pause to bow before Thee in the acknowledgment of Thy fatherly care and of our dependence upon Thee. We thank Thee for all good works begun and continued and completed in Thee, and we desire Thy fatherly benediction upon our efforts in the furthering of all good work, now and evermore, in the name of Jesus Christ our Lord. Amen.

PRESIDENT PRICE. I shall not undertake to read many of the very many letters and telegrams of congratulation, altho they would be interesting. You cannot know, however, the strength we feel in the united support of the dental profession. (At this point President Price read several telegrams.)

These are but samples of the wide spread desire that this work shall bud at this time into great usefulness for humanity.

In looking over your program you will see that we have rather a lengthy one, but I am sure it is going to be so pleasant that you will not find it tedious. You will note in the program a directory of the rooms, and when you go to those rooms you will find perhaps that they are used this evening for a coat-room, or for a kitchen, or perhaps for some of the banquet rooms, and you will understand that we could not have every room in order for its regular work. You will be pleased, I am sure, when you go down stairs to find that it has been made into a reserve library, and a metallurgical department which, tho with a limited equipment at present, is very strong in the hands of Dr. Frank A. Fahrenwald and his assistants. You will find, as you go to the bacteriological department an equipment ample for a splendid and a worthy work with Mr. Bensing in charge. I will not take time to give you a complete review of this directory, but we will ask you, after the lectures, to be free to go all over the buildings from top to bottom, and don't think that there are any places that you are barred from. There are no skeletons in any of the closets. I think it has been thoroly cleaned, and

you are at liberty to go anywhere and everywhere.

I cannot announce the program without first expressing our profound appreciation and gratitude to the friends of the work because of the many expressions that have been given in a very practical form. You will scarcely realize that almost the entire equipment of this building as it stands now has been given as a gift by some one, or some group of people. I do not know when anything has stirred my heart more than to have a large business firm send a representative here to measure up some of these large rooms for rugs and after they had measured first one and then another, to have them say to us, "Do you not need something else besides these rugs?"—because nearly all these splendid rugs were a gift from that firm. And the same spirit represented by others, "Isn't there something else you need?" In our modesty we said, "We do need some chairs for the board room." "All right, we will send you out half a dozen. Isn't there something else you need?" "Well, we could use a big flat-top desk." "All right; what else do you need?" We told them we ought not tell them of anything more. They assured us it was all right and asked what else do you need?" "Well, we could use a large flat-top table, suitable for the board room." "Yes, and what else do you need? Don't you need a large stand-up desk?" We suggested that we prefer to have our stenographers sit down to do their clerical work." "All right," he said, "we will send you some more chairs for the board room."

We could hardly exhaust the generosity of some of these big firms. I have not the time to tell you of all the good things. If you have not already, you will peep into the clinical room upstairs and find a big equipment, but not half of what has already been promised us to go into that room. In my hurry I may leave out some of the important ones, but I will name over some of the firms that have been helping us: The Sterling and Welch Company, The Halle Brothers, many of the big printing firms and publishing firms—Foreman and Bassett, S. Barker and Son, the Burrows Bros., Schuemann Jones Co., F. W. Roberts, The Hub of the dental manufacturers, Ransom and Randolph Co., S. S. White, Pelton and Crane, The Cleveland Dental Manufacturing Company, The Consolidated. But at this time I want in a public way to express our profound appreciation for this generosity that has made it possible to use the funds so generously given for research, for research work instead of for equipment.

And then I must speak of the splendid generosity of the dental profession. I am sure there has been no precedent in any profession, of the generosity and support of the dental profession as expressed in connection with this developmental work. When I tell you that practically ninety per cent. of the funds for carrying on these researches that have been going on for three years, in this department, have come from the dentists, amounting to approximately $60,000.00 from the dentists, in cash and pledges, not including the money to purchase this building, you will see somewhat of the earnestness with which they are taking up this work. And that does not represent a coerced contribution, it is a voluntary contribution. Have you asked yourself why they did it? It was because they knew and felt that humanity needs this research and that we owe it to humanity to find out for them some of the causes of infection, for example, the cause for dental caries, and the means for preventing mouth infections, and a great many of the other problems, and I say it was because of that conscious duty in the hearts of the dental profession that they became a part of the movement. And those of us who have been (incidentally) officers in connection with this work have felt that it came at just the psychological

moment. It could not have been otherwise; it was because of the support of the dental profession of the country.

We shall have our first greeting to you from the Vice-President of the Research Institute of the National Dental Association and from the man who is also the President of the National Dental Association, Dr. Thomas P. Hinman, of Atlanta, Ga., who will address you and bring you greetings from the Research Institute and also tell you something of the purpose of this corporation. He is probably the most loved man today in the entire dental profession—Dr. Thomas P. Hinman.

DR. HINMAN. It is very kind of Dr. Price to thus introduce me. There is nothing sweeter in the world than friendship. There is nothing more wonderful in the world than love. It has been the theme of the poets, it is the whole theme of the Bible—love. And what has made possible this institution? Love.

I am requested to extend to you, presidents of universities, distinguished visitors, members of the boards of trustees of universities, members of the boards of trustees of the hospitals, and the dental profession of Cleveland, and the visitors, and to the sweetest of all, the ladies, the greetings of this institution. And as I represent this great and glorious profession, and as it happens that I am president of the National Dental Association, an honor of course I fully appreciate that I do not deserve, and an honor that I feel was given in love instead of justice, I feel the responsibility of extending to each and every one of you, and the pleasure, too, of extending a greeting that is heart-felt.

It is said that southern hospitality is the greatest hospitality. Are you all conscious of the fact that this wonderful state of Ohio has given to the world, in medicine, in dentistry, in law, in theology, in politics, some of the greatest men, and men who have made more history than any other state in the Union? And why? Because you sprang from the cavalier stock, that is the reason, did you ever think of it? It is said that Virginia is the mother of presidents. True, and so is Ohio. And I believe that to this wonderful state, which has so generously supported this institution, is due the greatest credit that we can possibly give.

Now, as to the purposes of this institution. You are already familiar with it; there is no reason why I should tell you very much of the purposes. It is for humanity and it is for love.

I know that there has been more or less of a misapprehension on the part of some of the profession who have not known why this institution was placed here, and there may have been a feeling that some of the grants that have been made by the Research Commission will be discontinued and that there will be an attempt at concentration in this place. But I can tell you, gentlemen, on my honor as a man, there is no word of truth in it. On the contrary, the effort will be to amplify, if possible, and to increase the amounts that have been given as grants, and to make more grants. But it was necessary that this work be centralized.

Now, to all of you who believe in the Infinite and I am sure you all do, because you can not help it, down deep in your hearts you must believe in it let me say that I have become firmly convinced, after years of work, that this Research Commission, and that this building being placed in our hands, being so adaptable to our use, I say I am firmly convinced that these are the work of Providence. I do not say this without carefully considering; I believe it. And this institution, which will be for the benefit of humanity, will live longer than any member that is present here tonight.

I will not detain you longer, but only say that it is with joy inexpressible that I greet you, for I love you every one, of course the ladies. (Applause.)

PRESIDENT PRICE. We are honored by having guests from the far South, one of whom has just spoken to you, and guests from the far East and the far West. We find it difficult for lack of time to even tell you of them, but we are so glad to have them with us. And in behalf of the guests present, both dental, medical and also our friends from the laity, we have selected a man who has perhaps a larger interest and a larger heart for municipal interests than any member of the dental profession in America, a man who at present is the mayor of his city, the president of the Board of Education of his city, the guiding hand of the dental profession for decades, and when the Eastman Dental Infirmary was organized and they looked around for a man with an executive vision, competent to guide, with a knowledge of business and of professional requirements, they looked to that man of unique executive quality, of the sweetest spirit of affection and charity, Dr. Harvey J. Burkhart, of Batavia, New York. (Applause.)

DR. BURKHART. Mr. President, ladies and gentlemen: I take it that the very complimentary remarks which the President was pleased to make with reference to myself personally, may be taken very much as a clergyman would speak to a member of his flock, that "whom the Lord loveth, he chasteneth." (Laughter.) I also am led to believe that another reason for it was because I am an old Cleveland boy and because I was born over on the West Side. (Applause.) And I am perfectly frank to say to you that I should very much prefer to talk about the golden days of youth when we used to slip down back of Brainard's pasture there and go in swimming and do all those things that boys do in a careless way, long before we knew anything about Research Institutes, or sterilization, or this late preparedness talk. And I would much prefer to talk those things over with some of the old Cleveland boys than to present the greetings of almost anybody, Mr. President.

I feel particularly honored, and it is a rare pleasure to speak on behalf of the dental profession of this country and to present the congratulations and the greetings of the dentists of America on an occasion like this. It is an occasion that many of us have looked forward to for many years, and we are to be congratulated that we have an Executive Board connected with this Research Institute that is so able and so competent to carry on the work which it seems to have cut out for itself a long time before the dental profession really knew that anything of that sort was to be done. We have guiding hands here, we have guiding hands on this commission, and the dental profession appreciates most profoundly the necessity for an institution of this kind.

I look forward to the time when this Institute will be of tremendous influence and assistance, not only to the institution with which I am connected at the present time, but which will not be completed for a year or more, but will be of tremendous assistance to the various dental organizations thruout the country and thruout the world. You are well officered. The Institute has the support and the encouragement of the profession as a whole, and I bespeak for the officers of this association the success that should come to it on account of the labors which they have already performed and the splendid future which is before it.

There is just one word that I want you to take with you, and there is just one sentiment that I wish to express, altho I do it with some misgivings in the presence of some of the members of college faculties thruout the country who are present. As you all know, the dental schools purpose giving a four-years' course a year from next autumn, and in going to that four-years course I believe

a step has been taken in the right direction. But in amplification of that step there should, in my humble opinion, be one safeguard, there should be another step taken in advance to safeguard that step, and that is, in extending your course you should also extend your preliminary requirements. (Applause.) And I say it without any apology to the dental profession or to dentists present, that one of the weak spots in the dental profession has been the lack of preliminary preparation. We have not been educationally grounded as we should have been, and if we are going to maintain a position in the front rank and deserve to be classed with professional men, we must see to it that the young men who are coming into the profession shall be more highly and more generously educated than those who have come into it in the past. And it is up to the dental educational authorities and to the authorities connected with institutions of learning thruout the country, to see to it that the ground-work is accomplished so that fundamentally we shall start right. And the dental profession can render no greater service to this Institute than to require that the colleges shall maintain those standards which will turn out professional men who will be able to appreciate and to assist the work of the Institute.

And with that thought, gentlemen, I want to close by presenting the congratulations of the dental profession, to tell you how glad I am that we have with us tonight the distinguished gentleman from Minnesota, Dr. Chas. Mayo, the distinguished surgeon from Cleveland, Dr. George Crile, and other men who have honored us with their presence. And I hope and I know that this Institute will carry on the work which has been outlined for it, that it will meet with the success that it deserves, and I am sure the profession thruout this country will give it all the support that it deserves and will provide funds sufficient to carry on the work as it should be carried on. (Applause.)

PRESIDENT PRICE. If Ohio can set the pace for presidents, she can set the pace for some other things, too. Ohio has furnished probably twenty per cent. of the funds that have been available for carrying on this research work which has been supported by the dental profession of the entire country; and when we speak of the profession in Ohio, we naturally look to those fountains of inspiration and generosity, the first of which to boil over was Cincinnati, the next was Cleveland, and no city has ever set a pace that exceeded that set by Cleveland. And we are now to have greetings from the President of the Cleveland Dental Society, and before he speaks I want to express to everyone present the profound appreciation of the trustees of the Research Institute of the National Dental Association for the generosity and co-operation of the Cleveland Dental Society, who have so magnanimously given up their regular meeting for this month—their meetings are monthly—and are meeting with us to help honor and help dedicate this institution. We appreciate this co-operation very highly, and Dr. Edward H. Shannon, the President of the Cleveland Dental Society, than which there is no dental society anywhere in the country that has more clean men, and men with so high a standard of morality and ethics, or so high a standard of dental efficiency, will now speak to us. I introduce to you the President of the best dental society in the world. (Applause.)

DR. SHANNON. Mr. Chairman, ladies and gentlemen: I had thought by this time that Dr. Price had got rid of all these superlative compliments that he could possibly get away with. If you will pardon me, I am going to read what I have to say, because, if I did not, I

know I would not say what I intended to say:

It has been my unfortunate lot to be selected to represent the Cleveland Dental Society on this occasion. No doubt this honor was conferred on me because of my official capacity. This reminds me that President Wilson and I are in the same class—we are both presidents. We are alike, however, in another respect: President Wilson says some men are born troublesome, some have trouble thrust upon them, and other men acquire it. Presid nt Wilson confesses he belongs to the second class. So do I; trouble is thrust upon me.

This is only part of it. My greatest discomfort and sore embarrassment is like the honest Scotchman's. As the story goes, his wife was dying, and when Sandy heard her last request, which was that he ride on the seat with his mother-in-law on the day of the funeral, he reluctantly consented, but replied dolefully: "I'll do it, now I've promised, but I want to say, you have spoiled the day for me." (Laughter.)

This is a great occasion, we must admit; and I want to say, the day has been spoiled for me, but seeing I have promised, I will give you my word of greeting.

In speaking for the Cleveland Dental Society, I want to convey to you, in a few words, the pleasure we have in being participants with you in the opening exercises of the Research Institute of the National Dental Association. It is certainly a red-letter day when the dental profession of the country can put upon a substantial foundation so great a project as the Research Institute promises to be; and the dentists of Cleveland and especially the Cleveland Dental Society, consider it an honor to be guests on this occasion.

Gentlemen, I wonder if all of us, especially the dental and medical men here tonight, have stopped for a moment to consider seriously the importance of this occasion, the possibilities which the Research Institute promises for the future. To be sure, this is only the beginning, and naturally the progress will be slow. If the work the Institute has been able to do under favorable conditions, with whole-hearted but meager support, predicts what we may expect in the days to come, we should give the work our hearty approval and generous support. Indeed, because of what the Institute has already done, I am profoundly convinced that this is a most opportune time to launch a movement which is not only a benefit to mankind but an inspiration to the thinking dental and medical men of the world. The work of the Research Institute will be of invaluable assistance to progressive men everywhere, and of untold blessings and comfort to humanity.

We have with us this evening men who have labored long and arduously in this work. They have drawn upon their vital resources without reserve, and even after much untiring labor are just as energetic and enthusiastic as ever. But, gentlemen, the crowning glory of the success of the Institute cannot be obtained unless we of the dental profession co-operate with the Institute, and lend our aid to interest the laity in this research work which will mean so much to suffering mankind.

In offering our congratulations to the Research Institute of the National Dental Association this evening, it seems fitting that, in behalf of the Cleveland Dental Society, I should point to the fact that in meeting with the Institute in joint session on our regular meeting night, we are showing our interest and support of this movement. And, moreover, gentlemen, the dentists of Cleveland are interested in this work, as has been shown by their generous gifts. They are enthused because of the great possibilities of the work yet to be done. Its vision is so alluring, that, if carried to a

successful termination, it cannot be otherwise than beneficial.

There is no question in my mind but that the Cleveland Dental Society would be willing and happy to co-operate with the Research Institute of the National Dental Association in the furtherance of the work, in any way in which it can be of service.

I am very happy to be able to express to the Research Institute of the National Dental Association, in these few words, what I believe to be the sentiment of the Cleveland Dental Society, and it is our hope and desire that the results secured by the Institute will be many times greater than the fondest dreams of the optimists. (Applause.)

PRESIDENT PRICE. I want to say that already we have had requests from three of the study clubs of the Cleveland Dental Society for the privilege of meeting here. They will have the use of our library, and they will probably use this room that is marked "Reading Room" for their meetings, and we anticipate that great benefit may come not only to the local dental profession, but to visitors of the profession from anywhere and everywhere that will come here to further their interests.

I would like to speak for a moment of our library. All the volumes you see on those shelves carry the title "Research Institute of the National Dental Association." They are practically all free gifts and are a very complete library at this moment. And we will have duplicates of those down stairs, and any member of the dental profession from anywhere in the country may write in for any number of any magazine, and have it loaned to him for reference. So in that way we will serve not only the local profession, but the profession of the entire country.

When this work was started some three years ago, we had no home, no facilities, and no equipment. We had an opportunity, and men in the profession, with a desire to serve humanity, so we looked about to see where we could get accommodations; and naturally we looked to our splendid institutions. And when we went to the president of the Case School of Applied Science, Dr. Charles Howe, and to several of its professors, like Professors Miller, Smith and Fulton, and others in that institution, and asked if we could have some co-operation, some privilege of work in connection with the institution, they extended that privilege to us, not only generously, but enthusiastically. They set aside a research room that has been ours to turn the key and, President Howe, you will never know the benefit this privilege has been to the dental profession, for that enabled us to start lines of metallurgical research that we could not have started until months or years afterwards, had we not had that privilege. And in behalf of that splendid institution, and of the Western Reserve University, and other educational institutions, I shall ask Dr. Howe to give us a word of greeting at this time. President Charles S. Howe, of Case School of Applied Science. (Applause.)

DR. HOWE. Mr. President, and gentlemen of the dental profession: On behalf of the higher institutions of learning in Cleveland, it gives me very great pleasure to bring to you their congratulations and their greetings. You are not a university, but you are doing some of the work which a university has to do.

A university has at least three functions. The first function is to teach. It throws open its doors to young men, and sometimes to young women, and invites them to come in and receive what it has to give. It presents to them that which is known, gives them the knowledge which they ought to have in order to go out into life, and tries to train their minds so that they may do new things for themselves.

The next function of the university

is research. There is a duty placed upon it by the community, or by the knowledge and information which its professors have, to extend the bounds of human knowledge, and most of our universities are carrying on this particular work which seems to be theirs.

The university also has another function, and that is to give the results of this knowledge which it has obtained, to the world. It cannot take that which it has obtained thru research and keep it to itself, but it must put it where it will benefit humanity to the highest degree.

Now, in these two latter functions you are doing the work of the universities, and hence I claim there is a bond of union between you and us.

Some centuries ago there was a philosopher in Syracuse who was studying over a problem which had been presented to him. When he found the solution, he jumped out of his bath tub and ran thru the streets of his city said to have been very slightly clothed. Since that time and even before, there have been men who have turned toward research work in every country and in every age. The lure of the unknown has been on certain men to look into the future; to try to wrest the secrets of nature and bring them where they will be for the benefit of mankind or for the information of the world, has been the utmost pleasure and delight of certain individuals.

And it takes a man to do this kind of work. It is not play. It needs all the knowledge, all the skill, all the determination, all the imagination which a man can give to it, because one cannot do new work until he first knows what has been done. He must have a knowledge of what other men have done, and then he must have imagination enough to see what is possible, before he can take up a research problem. And after he has determined what that problem shall be, it needs all of his skill, all of his determination, all of his tenacity, to carry it thru to a successful conclusion. But the joy and happiness of this kind of work is beyond, I believe, any other joy of the world. It is a man's work in every way.

You gentlemen who are going to work in this research laboratory, will search for truth. Some men look for truth in the earth, where for centuries the forces of nature have been at work. Others look for it in the insect, which seems to float so lightly upon the air, and yet which may carry around with it the germs of disease, and death. Some look for it in the illimitable distances of the universe, and search the stars to find out their chemical composition or the movements which they have made, utterly impossible to observe without the aid of the most powerful telescope. Others search for truth in the human body, the life processes of which are not yet all known to your profession or to the medical profession. But in all of these you are hunting for things new, you are working for the benefit of humanity; and because you are doing these things, the institutions of higher learning in Cleveland welcome you to their number and promise you their hearty, cordial sympathy and support. (Applause.)

PRESIDENT PRICE. I am sure we are all stronger because of that splendid message. It is entirely in keeping with the spirit of the men who have been assisting us in this splendid department. I have to repeat again that this Research Department can never repay Professors Miller, Smith and Fulton of that institution, for their splendid co-operation, and Professor Whitman, of Adelbert, and dear old Dr. Morley, who helped us some years ago in some of our most important problems. We are profoundly indebted, Dr. Howe, to those splendid institutions for their co-operation and assistance.

In introducing the next speaker I can

not refrain from telling you a little incident that happened in Paris. It was on the occasion of a splendid banquet, given within six months, where, back of the lines those splendid physicians and nurses were repairing shattered bodies. They ceased, one day, long enough to have a meeting around the festive board. And as they so met, one man proposed a toast, and he said, "Gentlemen, I have a toast to propose—To the greatest surgeon in America," and they all stopped and listened and wondered who it was, "to Dr. George W. Crile, of Cleveland, America." (Applause.) And as they drank with enthusiasm to that splendid sentiment, a great French surgeon rose to his feet, and said, "Gentlemen, I wish to propose a toast to the greatest surgeon in the world—Dr. George W. Crile, of Cleveland, America." (Applause.)

You cannot know the strength that this Research Department feels in leaning on the shoulder of that great leader in research, that great humanitarian spirit, that leader in philanthropic organization, Dr. George W. Crile, of Cleveland! (Applause.)

DR. CRILE. Mr. President, ladies and gentlemen: First of all, I wish to offer my sincere congratulations to the dental profession for their altruism in establishing this research foundation, and to express my belief that the investigations of the workers in this institute will produce much that will be of value to medical science as well as to dentistry.

I assume that in this connection I am expected to speak of the physical sciences. It would be indeed difficult to conceive the lot of man without the setting in which the physical sciences have staged him today.

The difference between civilized man and prehistoric man is mainly in his greater control over the forces of nature. Science has measured the movements of planets in a universe infinitely large; it has found the movement of particles within the atom infinitely small; it has analyzed light and heat, color and sound; it has tamed the lightning and harnessed the waterfall; it has perforated the earth to secure metals and fuel; with these man has fashioned innumerable implements by means of which he has gained control over vast forces, has mastered the primeval forests, broken the fertile prairie; built houses, made clothes and awakened ancestral emotions to the strains of music. Science has created railways and steamboats thru the telegraph, the telephone and the wireless, science has annihilated space and time. By means of science man has devised marvelous weapons for his self-destruction in war; has created for himself a Frankenstein. Science has printed books, created schools and universities, and promoted art. In recent times science has delivered deeply into the mysteries of the mechanism of man's physical body in health and in disease. The science of medicine has purified the jungle, has made possible the building of the Panama Canal; medicine has created sanitary codes for the civilized world, has preserved armies in the field, has created hospitals, has conserved infancy, and given solace to old age. Science now is to illumine the work of earnest colleagues in the dental profession thru the mediation of this research foundation, and thus does science ever promote human progress. (Applause.)

DENTAL RESEARCH, ITS PLACE IN PREVENTIVE MEDICINE.*

By Charles H. Mayo.

IT IS a great pleasure to be here tonight if for no other reason than to hear the wonderful series of introductions. I think there can be no question but this is one of the most auspicious occasions the dental profession has ever known and I greatly appreciate the privilege of being present as a representative of the medical profession and of bringing their greetings to you.

In the great changes that are rapidly coming in all lines of thought and endeavor, the medical profession and the dental profession should not be separated. It is epoch marking that the dentists have raised the large sum of money with which to build and equip this home of research for the advancement of the knowledge of dentistry and the avoidance of preventable diseases caused by tooth-borne infection. I would mention here what has been done by the surgeons; three thousand of them. They have started the institution called the College of Surgeons of America, like the Royal College of England. More than half a million dollars has been raised among the members, not for buildings, but for work—toward the improvement of their profession, which in the end is to redound to the good of humanity.

The dental profession, as such, and the medical profession are too widely separated. It is much more important that the dentist should know something of medicine than that the opthalmologist and the otologist, as specialists, should know what they know of medicine, and yet they are dealing with small areas of the body not nearly so important from the standpoint of disease as that with which the dentist is responsible. I believe that in the future all must take the same studies, the same final examinations, and that all must go to the same institution of learning, up to the point where the diverging lines of study of the speciality must be undertaken. I believe also that in the future the dentist must be taken into the great American Medical Association, as a part of that body. It is going to be necessary.

As we see things today, it means there will be far less surgery and less sickness when the full benefit of the knowledge of modern dentistry and the cause of many diseases become known thruout the world. There should be four times as many dentists as there are today, and yet there is not room for more until they have educated the public to the necessity of their work. No matter how far advanced surgeons or medical men or men in any line of endeavor may be in a community, they know they could not have done their work unless the people of that community had been educated to the necessity for such work and the benefits they would derive from it.

Therefore, it is up to you dentists to institute an educational propaganda such as has been going out from the American Medical Association. You all know of their work during the past few years. They have distributed men thruout the

*Address at the dedication of The Research Institute of the National Dental Association, Cleveland, Ohio.

country who are educating the public as regards the necessity for early examination and treatment for cancer, in order that something may be done to obtain such cases for treatment during the curable stage of the disease. Educational measures of this kind should be undertaken in all branches of medicine which deal with public health.

History shows us that surgery is an ancient art. Skulls of two thousand years ago, found in South and Central America, show wonderful trephinings, well executed, on persons who lived for a long time after, as shown by the growth of bone into the openings. Similar skulls four to six thousand years old show evidence of dentistry. Our jaws have been gradually changing as different foods were adopted; thus man's face is becoming flatter. As we study the jaws of today, we find that we are losing the third molars; in the old jaws there was more than room enough for all the teeth. This is a change that has come about thru the cooking of food, which has obviated the necessity of gnawing and the strenuous use of the jaws.

Probably bad water is the most common and dangerous carrier of disease. The danger of infections that come thru food and drink was recognized from a practical standpoint by the Chinese ages ago. In his own country, the Chinaman drinks only boiled water with a few tea leaves added to make it palatable, and he takes only cooked or pickled food, so that, as a race, they have used greater care in the prevention of disease than most other nations. From China and India came vaccination, which in Europe was first practiced in Belgrade, Serbia.

As regards the diseases of childhood, it was thought necessary that children should have such diseases, and some mothers exposed their children in order to "get thru with it," while they were little. We know now that these unnecessary diseases all leave their scars, according to the seriousness of the infection; scarlet fever breaks down an enormous amount of the surface of the kidney, and chronic infections do the same thing in a small way.

Periods of progress in medicine have occurred only as scientific knowledge in general has advanced, yet wonderful strides have been made in all lines of medicine during the past century by the public's growing appreciation of the causes of disease and its prevention. The average duration of human life has been increased many years during the last half century, and this has come about more thru the protection of the people by public health laws and the saving of children that it did thru the knowledge of the use of drugs.

It is a hundred years since we began to preserve meats and vegetables by the process of canning while hot, and the exclusion of air by means of the sealed cover, but it was not until Pasteur's time that we understood the scientific reason for this in the destruction of bacteria by heat and the prevention of entrance of living germs in the process of sealing. The utmost credit is to be accorded Pasteur's work in teaching the bacterial causation of disease and therefore its prevention, and for placing vaccination and serum treatment on a scientific basis. Lister, appreciating Pasteur's work, applied its principles to surgery, by great precautions of cleanliness, by the use of bactericides in solution employed during operation, and the sealing or draining of wounds protected by adequate dressing.

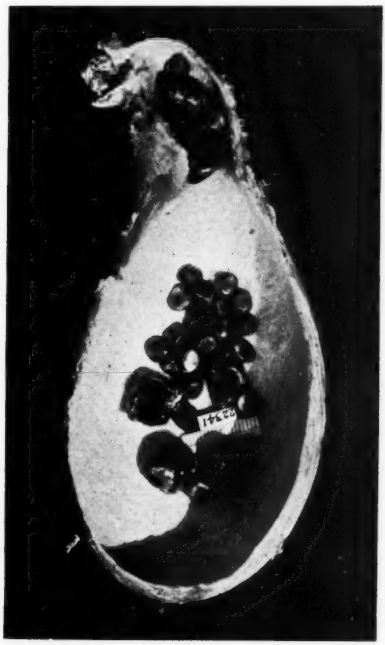
Metchnikoff advanced the work of Pasteur by a study of the effects of bacteria on the human body in chronic diseases thru the development of toxins, especially in the alimentary tract where their importance as destructive agents had been but little realized.

Wright advanced the scientific knowledge of blood resistance and blood cell destruction by the development of protective vaccines and serums in the control of acute diseases, the healing of

chronic diseases and the prevention of disease.

Each of these lines of scientific progress are being carried on by many who devote their time to the investigation of plant diseases and in their treatment of

Figure 1.



Photograph of gallbladder containing stones. Complete destruction of the mucosa. Stones in the cystic duct.

diseases of trees, fruits and grains, repair and seal wounds in a manner quite comparable to that in man. All cell life, whether it be of plant or animal, is similar according to its function, and is subject to the same laws of nutrition in development, maturity, decay and death, all of which we now realize enter into the fundamental laws of the universe.

Comparatively few of the enormous numbers of bacteria have been studied. Rosenow has shown that some of the most virulent to mankind may be changed in variety by environment and nutrition and increased or decreased in virulence. We have long known of the specific character of contagious and infectious diseases, and that the most minute amount of bacteria by contact or food reproduces these tremendously destructive diseases, as well as some simpler ones which are quite as contagious, but comparatively harmless. We know that some of these minute bacterial cells which cause disease live on intermediate life between their early form and late or destructive stage to human existence, much like the larval stage of many of the lower forms of animal life. The parasites of man become the intermediate host in typhus fever, while the male of two varieties of mosquito is the host in malaria and yellow fever. Some of the most destructive diseases of cattle are developed in the cattle tic, while the germs of the plague are carried by certain rodents.

How simple after all becomes the public protection of human life against its destructive agents when we understand them. By this knowledge Gorgas was able to free the Panama Canal Zone of disease and thus permit its upbuilding. The great war of the present can only be carried on by prevention and control of disease and the scientific treatment of wounds, as death in former years was eight times as frequent from such preventable (at the present time) causes as from injuries.

The next great advance in the prevention of disease, and that wherein dentists are so much interested, is the knowledge that chronic diseases, acute diseases and special local diseases, i. e., neuritis, sciatica and acute paralysis come from mouth infections in the majority of instances, also that appendicitis, diseases of the gall-bladder and ulcerated stomach are caused by bacterial infarcts in the capillary circulation at the base of the mucous cells in these organs, and is

caused in the same manner from local infections. While there are several sources in the body for the entrance of bacteria and their culture in a local focus, the mouth is far the most common situation. The tonsils very commonly harbor disease germs. We find these

Figure 2.

Photograph of infected gallbladder showing marked cholecystitis (strawberry type) with papilloma.

germs in pyorrhea in cavities and abscesses at the roots of teeth from natural decay and in apical abscesses all of which are often the result of bad dentistry. Bacteria, as has been noted, for all existence seem to be created by environment, or development for specific purposes and bacteria cultured from certain disease regions of the body seem to have almost a specific selection for similar regions in animals when injected into their blood; thus appendicitis, gall-bladder disease including stone, and ulcer of the stomach, can be reproduced as well as diseases of the nerves which are caused by infection. As before stated, these bacteria may be changed by environment and culture into different but similar strains having somewhat different activi-

Figure 3.

Photograph of gallbladder of a dog. Cholecystitis produced by the injection of streptococcus isolated from diseased gallbladder.

ties. On the other hand, the germ of measles, produces measles, the scarlet fever germ produces scarlet fever. Typhoid, small-pox and all the known contagious diseases reproduce a definite specific disease.

Rosenow has been able to produce, with bacteria cultures from diseased teeth in man, similar diseases of teeth in animals; the proportion is small as these animals are more resistant to such

infections. It must not be understood that the specificity of bacterial selection of location only occurs, but that there are side-lines of development in other organs and tissues. There would be a few cases of rheumatism and a few cases

Figure 4.

Photograph of duodenum of a dog, showing an ulcer 13 weeks after the injection of streptococcus isolated from teeth.

of infarction of the kidney, a few instances of myocardial inflammation and similar conditions thruout the body, but the main result of the experiment is to locate the disease in a similar region from that which the culture was taken, when cultured from secondary foci of disease. Those persons who have chronic local disease and also a septic focus about teeth or tonsils may often have the specific location of the primary focus proved by experimental work in animals, as well as being cured of the local infection.

There is much to be studied in the line of dental research, and there is a great necessity for this very building. It has come just at the psychological moment, when we are all engrossed in the study

Figure 5.

Photomicrograph of streptococcus, the type of bacteria producing the lesions described in the foregoing.

of diseases from their inception. For this reason, the dentist must have a greater knowledge of medicine, and a certain amount of knowledge of dentistry, so far as concerns the examination of patients, should be the province of every physician—not that they must treat these diseases, but that they should be able to recognize the necessity for treatment. The bulk of the dentist's work should be referred work of physicians versed in the rudiments of dentistry.

SOME EVIDENCES OF THE IMPORTANCE OF THE DENTAL PATH AS A SOURCE OF SERIOUS LOCALIZED AND GENERAL INFECTIONS.[1]

By Thomas B. Hartzell, D. M. D., M. D., Research Professor of Mouth Infections, Medical School, and Professor of Oral Surgery and Clinical Pathology, College of Dentistry, University of Minnesota.

IT IS a great privilege to address you this evening on the occasion of the dedication of this building to the uses of the Research Institute of the National Dental Association. The challenge of Doctor Mayo, given us three years ago in Chicago to add our share as a profession to the great work being done in preventive medicine, has been accepted by us in good faith, and it is indeed a happy event and a matter for congratulation that we enjoy his counsel and assistance in guiding the work of the Research Institute so splendidly initiated and carried forward by the untiring efforts of our chairman, Doctor Price.

It has been an inspiration to listen to the wonderful address of Doctor Mayo this evening, and I am sure that the various workers in the research field of the National Dental Association will attack their problems with renewed vigor and intensified interest as a result of the words of inspiration uttered by him. Never has there been a time in the history of medicine and dentistry when these two professions have been in such perfect accord, and we, as a dental profession, have cause to be grateful that these great leaders in the constructive work of medicine and surgery, Doctors Mayo and Crile, are members of our administrative body, giving their time and effort to aid us in the task which we have undertaken.

I have believed for many years that some of our methods of practice in dentistry have been responsible for the loss of human life, because we have fostered conditions in practice which have led to the introduction of needless infection into the circulation of patients under our care and my part of the research has been to gather proof to fix the responsibility for the introduction of such infections upon our own shoulders, and at the same time to point out methods of preventing them. I shall take the liberty of discussing only those types of infection which are most common, not attempting to deal either with the rare infections or those now well understood, of which latter diphtheria is an example. It is indeed true that the mouth, by reason of its size and function, is probably the host at one time or another of almost every type of bacterial growth. The great majority of these growths, however, are visitors and not permanent inhabitants. It is the permanent inhabitants that are found in all mouths which interest us most, and, of these permanent inhabitants, there is

[1]Read at the dedication of the Research Institute of the National Dental Association, Cleveland, Ohio.

not one possessing such varied possibilities for disease as the streptococcus group and to it we will devote most of our attention. I wish to state clearly in the beginning that in discussing the varied activities of the streptococci, I am well aware that I am not bringing new material regarding the activity of this organism. We all know that most of the lesions in different parts of the body produced by the streptococci have been studied in detail by many observers. I do wish, however, to make the point that while Rosenow, Klotz, Poynton and Payne, and many others have worked with the streptococcus, they have wrought without particular reference to the dental avenues of infection, and it was not until the work of Goadby, published in 1912 in the rheumatism number of the London Practitioner, that particular reference to the tooth avenue of infection received systemic or detailed study in the years 1910, 1911, and 1912 carried on a series of studies by which he was able to produce experimental rheumatism in rabbits, and, by the elimination of primary foci in the dental tract and the use of vaccines to supplement elimination, he was able to secure the recovery of three severe cases of arthritis deformans. To him, therefore, I think must be given the credit for publishing the first observations on the relation of dental infection to that form of rheumatism.

If there be anything of marked value in this paper which may be of future use, it will be in the fact that it offers definite and positive proof that the so-called dental path of infection hitherto little appreciated is shown to be important and that organisms taken from the dental path have produced in animals almost all of the forms of lesion hitherto described; to wit, lesions of the heart-muscle and endocardium, lesions of the kidney, focal and diffuse, lesions of the adventitia of the blood-vessels, and lesions of joints and muscles. The evidence of Poynton and Payne (1) gained by creating an experimental iritis in the eye of a rabbit by introducing streptococci in the circulation of the animal, together with the positive clinical results gained by the treatment of our twenty cases of iritis, enables us to place iritis in this category also.

Before proceeding to further discussion of infections, I wish to speak of the dental tract itself. We have in the dental tract the masticating mechanism originating in the epithelium of the mucous membrane, budding and projecting from it into the tissues to later become inclosed by bony walls which grow and finally almost envelope it. Its direction of growth in the first instance is downward and into the tissues, the tooth later bursting the very mucous membrane from which it originated (Figs. 1, 2, 3). The mucous membrane is designed to protect the tissues, blood stream, and lymphatics from infection. The union of the mucous membrane to tooth structure is always, after the eruption of a tooth, imperfect and capable of admitting infection. It is a notable fact that the dental structure has no protecting device, save its coat of enamel. If this be in any way imperfect there seems to be no anti-bodies or protecting leucocytes in the saliva to save it from the disintegrating effect of bacterial action. Unless aid be given by thoro cleansing of tooth surfaces, the integrity of the tooth is sooner or later destroyed by acid-forming micro-organisms which make its surface their home and later enter into its structure. How great a site for bacteria the tooth surface is can only be appreciated by the use of some method of staining bacterial masses in situ. If in the study of mouth infections, particularly those about the teeth, the observer will use a disclosing solution as recommended by Skinner, freely applied to the tooth's surface, he will bring to view macroscopically, masses of liv-

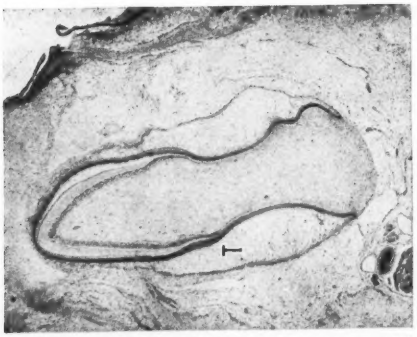


Fig. 3. Shows the tooth crown partially formed containing a large pulp.

Fig. 2. Slightly more advanced.

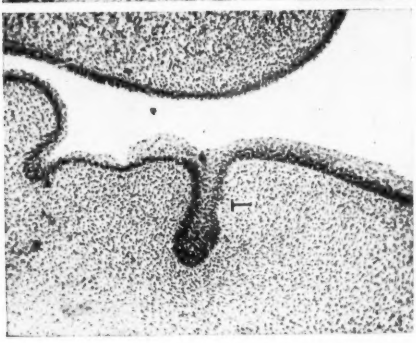


Fig. 1. Epithelial cord showing the beginning of tooth formation, T.

ing bacteria, which Kligler (2) has shown to contain twenty, to six hundred million to the milligramme (Fig. 4). These will be found on cultural and microscopic examination to count among their numbers, the streptococcus, the various staphylococci, the pneumococcus, the spirochæte macrodentium and microdentium generally, and always the fusiform bacillus. In addition to these already mentioned are two protozoa, the entamœba buccalis and the trichomonas intestinalis. It will be seen from a study of the flora of the tooth surface that this flora always has the power to infect the soft tissues about it. Next we will show the capability of the structures about the tooth to receive infection from it.

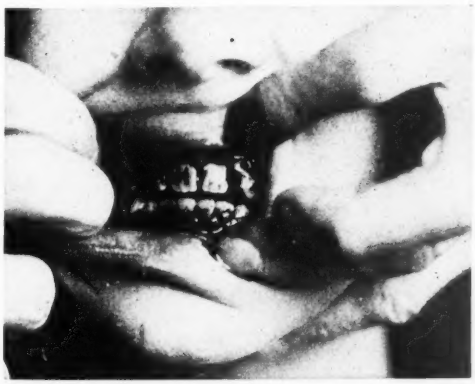


Fig. 4. Showing bacteria stain in mass on the teeth of a child. These teeth without discoloring stain are white.

Our next point of interest, therefore, is the gingival crevice or gum marginal crevice, in total length about thirty inches, protected externally by a tough pavement epithelium, but containing almost no epithelial protection (Fig. 5) at its point of union with the tooth structure. This lack of protection is well illustrated by recent preparations of Henrici, originally made to demonstrate the vascularity of (Fig. 6) the tissues immediately surrounding the teeth but showing as well the lack of mucous-membrane protection at the gingival crevice. It will be seen by a study of these pictures that motile organisms growing on the tooth's surface or organisms which reproduce rapidly may readily pass into the delicate openings in the bottom of this crevice, thus gaining direct access to venules and perivascular lymph-spaces in these structures, with nothing to hinder their transfer to the deeper tissues by the lmyph and blood streams. This process is in the majority of individuals greatly aided by the formation of calculus (Fig 7) on the root surface or at the gingival margin. When once an organism enters the tissue at this point its future progress into the tissues is hastened by the vast power of mastication, the sum of masticatory pressures amounting to about one ton per day in the average individual. The masticatory force depresses the tooth in its joint or socket and the elasticity of the tissues causes rebound when the power of occlusion is released. The tooth, therefore, plays the part of a piston during mastication with the average movement of a sixtieth of an inch. It cannot be doubted that this movement

aids the ingress of organisms to the underlying tissues thru the unprotected areas of the gum crevice. The masses of bacteria growing on the tooth's surface and in the gingival crevice, even if they do not always gain access to the tissues in the way just described, produce enzymes and irritating toxins, which inflame the gum margin, resulting in œdema and further favoring bacterial development in this thin wedge of tissue. This brings about as a rule destruction of the few cells lining the crevice, causing ulceration (Fig. 8), paving a way presently to pyorrhœa and providing the potential for peridental inflammations such as abscess, etc. The writer has record of one hundred and fifty teeth which were absolutely sound as far as the enamel was concerned, the pulps of which had been destroyed by infection, and we quite often find teeth, the pulps of which are undergoing profound inflammation without having been exposed by decay. The most plausible explanation for this is, that this richly vascular tissue surrounding the tooth has received infective organisms from the tooth's surface which have been conveyed thru the vessels to the pulp, as we have been able in many instances to obtain micro-organisms in these newly opened pulp chambers. It is not surprising, therefore, that we have abscess in the tissues about living teeth as well as about dead or pulpless teeth, because the conditions favor the planting of infection in this locality. It may be that a dead tooth provides a locus minoris resistentiæ (3) in its neighborhood, but to accept this as a principle governing the formation of abscess about all dead teeth, or even in the majority of instances, I regard as premature and likely to lead to a wrong attitude on the part of dentists and physicians concerning a very vital subject.

In the study of a series of acute dental

Fig. 5. Normal human gum, showing bottom of a crevice poorly protected by epithelium.

abscesses during the past year we find the staphylococcus the active organism, while in the study of material taken from 250 chronic abscesses of the cystic or granulomatus type, the streptococcus viridans is found to be the predominating organism. All teeth whose pulps have become exposed thru the medium of caries are infected and mastication into the pulp chambers of such teeth insures infection of the para-apical tissue. Teeth which are heavily coated with bacterial masses, particularly the protected surfaces in the proximal spaces, are capable of and do plant infection in the tissues contiguous to them.

A further evidence of how readily this may occur is shown by a series of recent experiments with oxygen under com-

pression which was discharged into the gum crevice from a blunt needle, not thrusting the needle deep into the crevice, but only half way toward the bottom. The oxygen will enter and be seen to lift the tissues back toward the palate and many times bubbling out of the tissues from the gum margin of a tooth a half or three-quarters of an inch removed from the point of entrance. This shows the extreme looseness of attachment of the peridental membrane and the ease of its infection. If pyorrhœa obtains for some time, say long enough to produce an average depth of ulcerating surface of a quarter of an inch about each of the teeth, we then have an ulcerating surface of seven and one-half square inches. If the average depth of pocket was only one-eighth of an inch, we have an ulcer equivalent to three and one-fourth square inches. Compare this ulcerating surface infected with all sorts of organisms to the greatest possibility of the tonsils with eight to sixteen crypts in each, and you have some idea of the relative importance of the dental tract in the planting of general infection.

Ulrich (4) in his paper entitled "Some Medical Aspects of Dental Disease" teaches that dental abscesses originate in the blood stream but does not tell us how the infection enters the blood claiming that the lack of vital pulp is the determining factor in the locating of abscess. As a matter of fact, hundreds of pulpless teeth are in use that are not abscessed. It is needless to state that septic root canals are responsible for many dental abscesses and it is true that modern methods have made possible the safe retention of such teeth where the individual is otherwise in good health, but on account of the exact technic to gain and maintain asepsis in such teeth, they should always be kept under surveillance by radiographic methods. Our own conclusions and belief regarding the infections that occur in the dental tract are that they usually enter by and thru the gum crevice, venæ, perivascular lymph-spaces and root-canals when opened by ulceration, decay, or careless operative procedure.

Two years ago the scientific foundation and research commission of the National Dental Association placed in our hands a sum of money ($2,000 per year), which we determined to use to gather evidence of the relationships that mouth infection bear to metastatic infection of other parts of the body. This research has been carried on in the laboratories of the school of medicine and has been assisted during the past year by an additional grant of funds from the research department of the graduate school. The laboratory procedures have been carried forward by Doctor Henrici of the school of medicine. Our endeavor has been to approve or disapprove, as the case might be, the clinical evidence tending to connect infections about the teeth with distant secondary infections

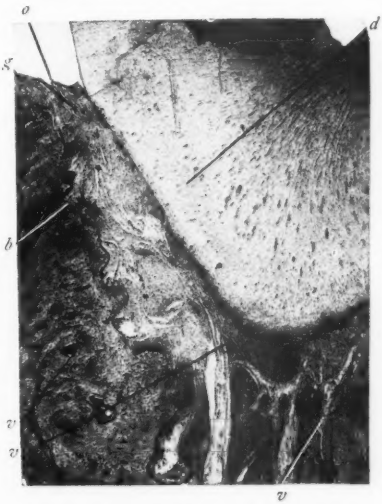


Fig. 6. Showing venæ extending almost to the gingival crevice and leading into the peridental membrane. g, Gum edge, o, opening into vessels of peridental membrane, d, dentine, b, bone, v, network of vessels.

of other parts of the body. To that end, we have used bacterial cultures obtained from both pyorrhœa pockets and apical

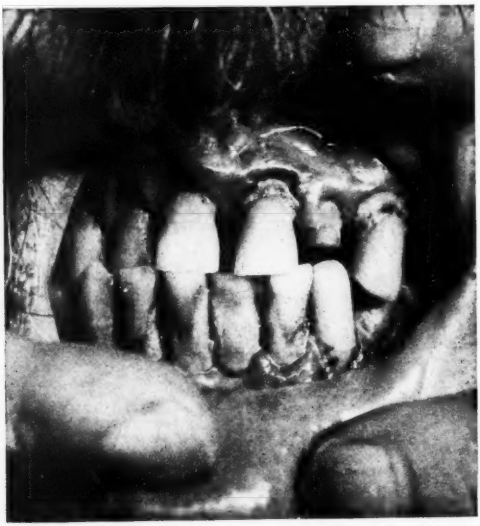


Fig. 7. Showing calculus on the tooth's n ck and pus flowing from well-marked pyorrhœa pockets i·· the mouth of a man who now has a multiple arthritis.

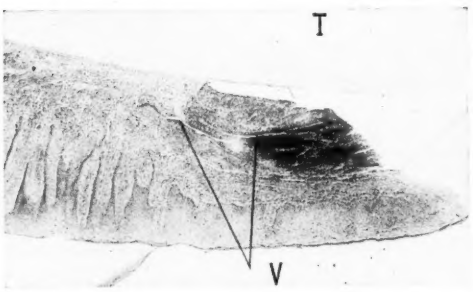


Fig. 8. Showing human pyorrhœa pocket. Note the great mass of plasma cells on the ulcerating surface of the pocket. T, tooth, V, vessel.

abscesses of individuals suffering secondary infection. From our first series of cases resident in the university hospital we were able to produce lesions of heart-muscle and endocardium, as illustrated by the three accompanying photographs. Figure 9 shows chronic myocarditis in the heart-muscle of a rabbit which died sixteen days after an injection of streptococci from Case 55. The section shows an area of fibrosis with several giant

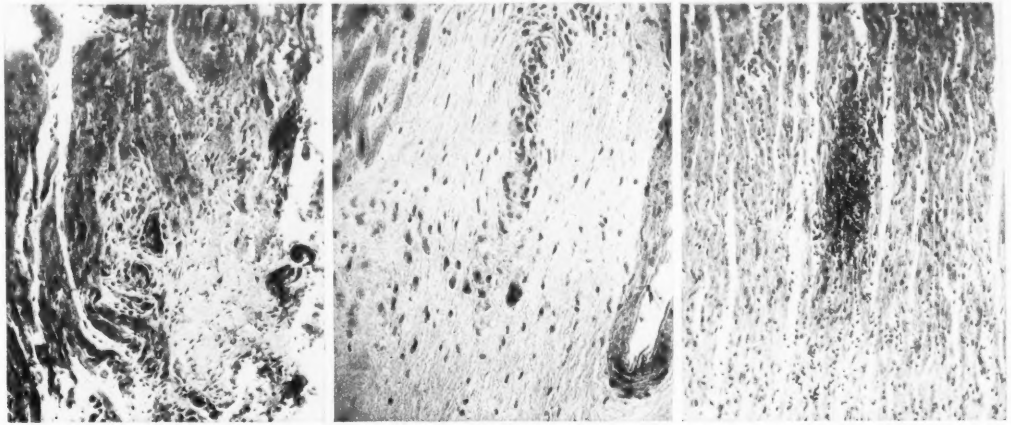


Fig. 9. Fig. 10. Fig. 11.

Fig. 9. Shows experimental myocarditis in a rabbit. Note the fibrosis and giant cells of the type described by Aschoff.

Fig. 10. Shows an identical type of myocarditis in a human heart, that of a girl fourteen years of age, who died after repeated attacks of acute rheumatic fever with chorea.

Fig. 11. Shows acute myocarditis produced from material taken from a dental abscess that of a man who was suffering an acute iritis, whose eye is shown in Fig. 12.

cells. This is myocarditis of the type described by Aschoff, generally considered to be specifically rheumatic in nature (Fig. 10.)

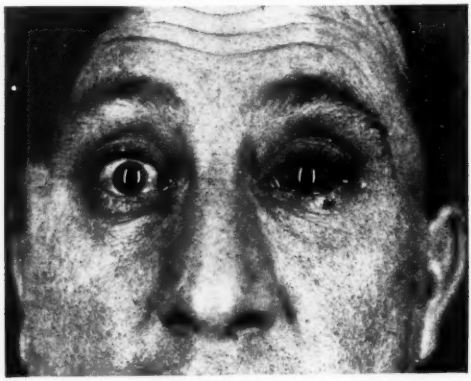


Fig. 12. Shows eyes of patient with severe iritis due to a dental abscess.

Case 55, from which we obtained the culture which produced the experimental myocarditis shown in Fig. 9, was that of a married woman of forty years of age, of German descent, by occupation a housewife, weight 150 pounds, of good habits, with no trace of familial of veneral dis-

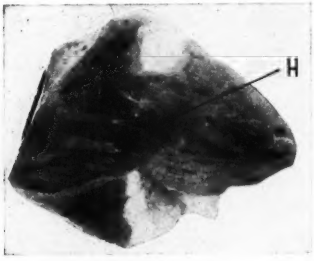


Fig. 13. Note hæmorrhage at the base of Pupilary muscles, H.

ease. When she came under our care, January 18, 1914, she had pyorrhea alveolaris, congestion of the lung bases, cardiac hypertrophy and dilatation, acute hypertrophy and dilatation, mitral incompetency and stenosis, acute aribritis, with swollen joints. The culture material was obtained from pyorrhœa pockets and extracted roots. Its effect on the heart, muscle of a rabbit was profound as you note. The result of treatment in this case was quite satisfactory.

Figure 11 shows an area of acute infection involving seven or eight heart-muscle fibers in the heart of a rabbit which died forty-eight hours after an injection of streptococci obtained from Case 60, that of a man who was suffering an acute iritis evidently the result of a dental abscess involving the left antrum. The iris presented posterior synechia and a marked congestion accompanied by great pain (Fig. 12). Extraction of the tooth and curettement of the sockets resulted in a rapid reduction in the inflammation of the eye and the material obtained from the tooth socket developed not only the acute inflammation shown in this picture but also a hæmorrhage into the mitral cusp of the rabbit's heart shown in Fig. 13. Here we have chronic infection of the heart-muscle with repair by scar-tissue, acute focal infection of the heart-muscle, and a hæmorrhage under the endocardium produced by the streptococcus viridans from this single source, a dental abscess.

We have since produced many such lesions with the streptococcus ordinarily found in the saliva and I will show next a section of heart-muscle in a rabbit which has received an injection of streptococci obtained not from a lesion but from saliva (Fig. 14. Note destruction of muscle-fibers).

Besides lesions of the heart-muscle, lesions of the heart valves are most commonly associated with rheumatism. The relationship of the streptococcus viri-

dans to endocarditis has been produced in rabbits by inoculation with streptococci repeatedly, especially by Poynton and Payne and by Rosenow. Figure 15 shows vegetations on the mitral value of a patient in our series who had multiple dental abscesses. Figure 16 shows vegtative endocarditis in a rabbit experimentally produced by inoculation with streptococci obtained from a dental abscess.

Lesions of the blood-vessels accompanying rheumatism were noted in 1828 by Trousseau,[1] and also by Hanot,[2] who supported his observations by autopsy.

"Roche and Burnand (5) reported the case of a man, age 30, who had long suffered from rheumatism. His first attack had occurred seventeen years previously and since then he had suffered recurrent attacks, in each of which the heart was more or less involved. Recently, his heart failed to compensate for the severe lesions of the mitral and aortic valves. When seen by the author, he was cyanosed and showed œdema of the lower extremeties. He had continuous fever of moderate degree. After some weeks his temperature suddenly went up, and he complained of pain in the left arm, which continued to increase. In three days the radial pulse disappeared, gradually a small radial pulse was again obtained. After some weeks a mass appeared close to the upper humerus which was quite painful to touch. Later on, the patient developed a similar lesion in the left arm.

"Much other material may be found bearing on this same question of vascular lesions from Leger (6) and Hanot (7) who described rheumatic aoritis, while Rabe (8) has studied rheumatic disease in the coronary artery. The latter described two principal lesions, one consisting of a proliferating endarteritis, the other of a diffuse mesarteritis. It is probable that the other peripheral arteries react in a manner similar to but milder than in the coronary arteries (9)."

We have made the above citations and show the following arterial lesion pictures to suggest the fallacy of the old established belief that all aortic arch lesions are specific when it is quite possible that some may also be of streptococcal origin. The relationship of rheumatism to diseases of the aortic arch has been recently studied by Klotz (9), who finds constantly a characteristic lesion of the adventitia. Such a lesion is shown in Fig. 17, which is a section of the aorta of the girl whose myocardium is shown in Fig. 10. The section shows submiliary foci of infiltration about the vasovasorum of the adventitia. Figure 18 shows a similar but more extensive lesion in the adventitia of the aorta of a rabbit inoculated with streptococcus viridans from a dental abscess.

In a recent series of thirty animals in-

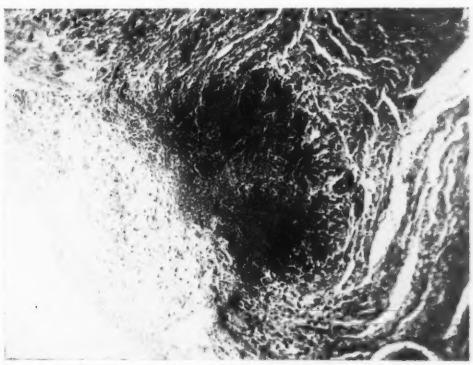


Fig. 14. Heart-muscle fibers destroyed by salivary streptococcus.

[1]Archiv gén.. de méd., 1828, xvi, 499.
[2]Presse méd., Par., 1896, i, p. 649.

oculated with ordinary salivary streptococci by us, we have found a number of animals whose joints are filled with pus-containing streptococcus viridans. They also exhibit heart-muscle infection, and well-formed vegetations on heart-valves, focal infections of the kidneys as well as diffused kidney infection. In ordinary salivary streptococci will produce these lesions just as will streptococci taken from the dental abscess or the pyorrhœa pocket, it would seem well worth while to give greater attention to closing the door to this infection by treatment directed toward the prevention and cure of pyorrhœa and dental abscess and the maintenance of health in the whole dental tract.

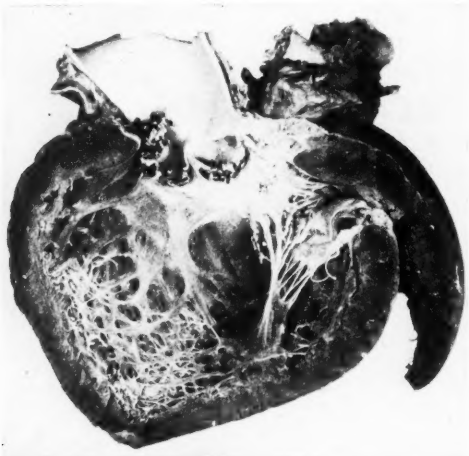


Fig. 15. Shows vegetations on the mitral valve of a patient in our series who had multiple dental abscesses.

Fig. 16. Vegetative endocarditis in a rabbit experimentally produced by inoculation with streptococci obtained from a dental abscess.

In addition to the lesions already shown which involve heart-muscle, endocardium, and vessels, we desire to show you a picture of a focal and diffused infection of the kidneys produced from material taken from a dental abscess from Case 59, which produced two types of streptococci; one growing gray on blood agar, the other growing green. Both strains were isolated in pure culture. In massive doses, broth culture produced death in twenty-four hours; in smaller doses (8 cm.), death occurred in forty-eight hours. The green strain produced hæmorrhage into the mitral cusp of the rabbit's heart, the other strain produced minute multiple abscesses thruout the kidney cortex. The streptocccci were re-obtained in pure culture from the blood of both rabbits, and, after

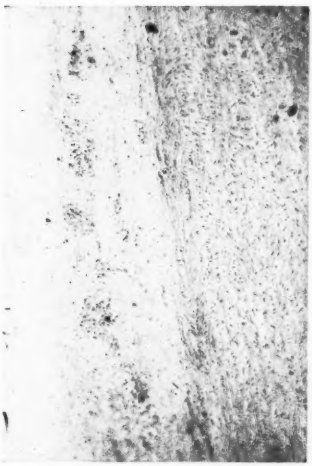
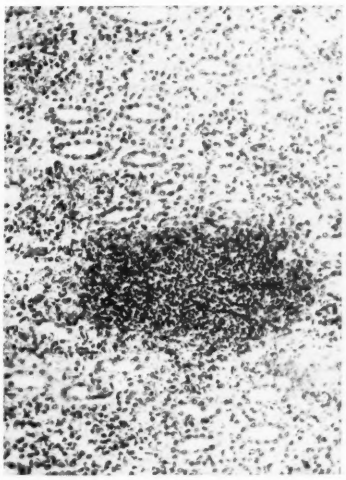


Fig. 17 (at left). Section of the aorta of the girl whose myocardium is shown in Fig. 10.

Fig. 18. A similar but more extensive lesion in the adventitia of the aorta of a rabbit inoculated with streptococcus viridans from a dental abscess.



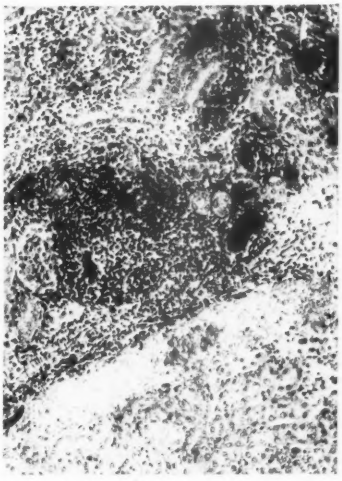


Fig. 19 (at left). Multiple abscesses in the cortex of a rabbit's kidney induced by material originally obtained from a dental abscess in the mouth of a man whose hands and feet are shown in Figs. 21 and 22.

Fig. 20. Bacterial emboli and the capillaries of the cortex have surrounding areas of inflammatory infiltration which show both pus-cells and lymphocytes.

twenty-four hours' incubation, were injected into two new rabbits in 5 ccm. doses. Both of these rabbits died within 48 hours. The autopsy revealed no lesions save for a large number of miliary abscesses in the cortex of the kidneys (Fig. 19). The streptococci were again recovered in pure culture from the heart's blood and from the kidneys, and these are the kidneys shown in microscopic section (Fig. 20). They show bacterial emboli, and the capillaries of the cortex have surrounding areas of inflammatory infiltration which exhibit both polymorphonuclears and lymphocytes. There was a pronounced necrosis in the breast muscles of a pigeon inoculated with this strain, which died within twenty-four hours. Our comment on this strain is that we have apparently an organism belonging to the streptococcus viridans class possessing a high degree of virulence which is indicated by the rapidity with which it causes death in animals and by the fact that it calls out pus-cells in the infected animals. We note also that this strain shows a marked affinity for kidneys as there were no joint lesions and no heart lesions except a valve hæmorrhage.

Fig. 21. Hands of a man from whose dental abscesses we took the material originally to produce the lesions in Figs. 19 and 20.

Case 59. The patient from whose dental abscess the first culture was obtained is forty years of age and has suffered from arthritis deformans for twenty years. This has resulted in the partial disarticulation of his phalangeal joints of both hands and feet as shown by the accompanying pictures (Figs. 21 and 22.)

While we have not done systematic research with the other constant bacterial inhabitants of the mouth we have dealt practically with many cases of secondary infection in which the primary lesion commenced in the dental arches and resulted in multiple abscesses in different parts of the body.

A recent case, that of a youth of sixteen, developed an acute primary abscess in a lower central. This resulted in a general pyæmia producing abscesses in different parts of the body, the most pronounced of which were in the gluteal muscles. The primary effect of the infection in the jaws was to destroy the whole body of the lower jaw from the ramus forward, the whole body of which has been removed gradually, retaining only enough of it to act as a split while the new body has developed.

Cases of this type are fairly common particularly in the mouths of people who are careless in the care of their teeth.

A second of the acute staphylococcal type was that of a physician with a primary abscess about a lower molar which resulted in the loss of one inch and a half of bone and the destruction of the facial nerve on the right side.

A third case of similar nature, a primary staphylococcal abscess about the lower third molar in the mouth of a young Swedish girl, resulted in the loss of the angle of the jaw and secondary metastatic abscesses in other parts of the body.

In addition to these cases we have on record the experience gained in the care of six individuals who died as a result of primary mouth infections spreading to other parts of the body in which cases autopsy disclosed only the mouth as a primary focus. One of these deaths was due to a fusiform bacillus infection originating around two central incisors. The

Fig. 22. Feet of man from whose dental abscesses material was taken to produce the lesions in Figs. 19 and 20.

primary culture and smear disclosed normous numbers of fusiform bacilli in this slough and a blood culture taken by Doctor Larson disclosed a general fusiform bacillus infection in the blood stream. Our experience with the damaging effects of the diplococcus as a mouth inhabitant is limited to one case in which the primary infection around a bicuspid yielded the diplococcus pneumonia in large numbers. Removal was coincident with a pneumonia involving the lower lobes of each lung. The patient made an uneventful recovery from the pneumonia two years ago last winter only to die of a second pneumonia January, 1914. The infected socket had been the host of this stinking abscess for some five years prior to its removal. Surely the responsibilites of those who have to do with the prevention of the development and growth of streptococci in the mouths of people are of a grave nature indeed. Bacteria grow on the mucous membranes but sparsely as compared to the enormous numbers, particularly of streptococci, which grow on tooth surfaces and in gum crevices, and the further fact that we have a direct continuity of the tooth's surface with the imperfectly protected gingival crevice makes the tooth's surface, when loaded with organisms, a factor worthy of the serious consideration of those who deal with human life.

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SPECIAL ANNOUNCEMENT.

A Solder for Tungsten and Molybdenum.

The Research Department of the National Dental Association is now prepared to furnish to the dental profession, for their trial, comment and criticism, a flux that will enable them to solder gold and its alloys directly on to bare tungsten and molybdenum, or their alloys. We have referred to this in a previous report, March, 1915, as being under process of development. We do this on the condition that those using it will send us a record of their results on forms which will be submitted for that purpose. Those desiring this material will kindly enclose, with their application, $1.00 for a quantity of the flux and directions for its use. The perfection of this flux makes it possible for the profession to use bare tungsten and molybdenum and, thereby, save the additional cost of having it coated with gold or gold compounds, by wetting or coating their own specimens when small and thus preparing the surface so that fusing and casting operations will attach to the tungsten. We have found this process to work with splendid satisfaction in our own hands but, before publishing the formulæ, we will continue to improve them and for this purpose we desire to know whether the present product is adaptable to the skill and technic of the average dental practitioner.

THE RESEARCH INSTITUTE OF
THE NATIONAL DENTAL ASSOCIATION,
8803 Euclid Avenue,
Cleveland, Ohio.

THE LIBRARY OF THE RESEARCH INSTITUTE OF THE NATIONAL DENTAL ASSOCIATION.

The Trustees of the Research Institution have undertaken to establish in the Institute the most complete dental library in the world. This will include both a reference library for the research workers and a circulating department for the members of the profession, and it is hoped to make it available to the entire profession. To make this possible it is necessary to have the co-operation of the members of the dental profession thruout the country, whom we are asking to send in old journals in order that we may complete our files. We can get plenty of journals of the last fifteen years but desire particularly the early issues. Also transactions of societies, and any and all works possible on dentistry, all of which will be credited to the donors. There are hundreds of back numbers of journals which are eagerly being sought after by many libraries to complete their files for binding, but which are stored away in attics, cellars and closets soon to be condemned to the junk dealer. We will ask you to box these up and send them by freight, to the Research Institute of the National Dental Association, 8803 Euclid Avenue. What we cannot use we will exchange with other libraries, by which means we will not only help to complete their files but secure in exchange, journals that will help complete ours. Please write us at once, if you know where we may locate quantities of early numbers of the various dental journals, and regarding dental books, old and new, that you will be willing to contribute to the library. WESTON A. PRICE.

ITEMS OF INTEREST.

THE HISTORY OF OUR CHRISTMAS SEAL.

Dr. Otto U. King, Huntington, Ind.

My Dear Dr. King:—With my Christmas and New Year's greeting to you, I want to congratulate you personally, as I believe the members of the National Dental Association are doing for the attractive and ably edited Journal you have sent out to them the past year. We have reason to rejoice and be glad, for with the New Year, dentistry offers for the world's inspection, educational institutions, literature, Society organizations, magnificent public charities, and a National Journal that ranks with the best; all of which has received recognition and commendation from the scientific and professional societies of the world. The one regret that forces expression is, that so many of the good men that made Dentistry a profession, passed the closing years of their life dependent on the charity of a few friends.

A few had occasionally talked of a Relief Fund, but action was taken only a few years ago when a Relief Fund Committee was appointed by the National Association. The Committee started out with high hopes and enthusiasm, believing that a generous response would be made to their appeal for contributions. The dental journals were generous in giving space, Dr. R. Ottolengui suggested a Christmas seal, one was designed by Dr. Charles McManus and put on sale; while a considerable number were sold, it was evident the appeal was seen and read by very few. A suggestion was made that our members contribute the fee for one hour's service, in October, each year to the fund. If only a tenth of our membership would do so for a few years, a large and adequate sum would result, but I am fully convinced that few saw or read these appeals. With others, I attended the Sixth International Dental Congress held in London, August, 1914. The "bright spots" in that month's worried experience were two delightful afternoons spent in company with Dr. E. S. Gaylord and my son, Dr. Charles, in the pleasant rooms of Mr. C. Robbins, No. 6 Stratford Place, London W.

Over the hospitable cup of tea, and cakes, the record of the British Dental Benevolent Fund was told by Mr. Robbins, one of the early members, and most efficient executive officer, for the past thirty years. The British Dental Association has two thousand two hundred and fifty members; of these, five hundred and sixty-four were contributors to the "Benevolent Fund" the previous year.

It was intensely interesting as Mr. Robbins told of the ways and means taken to solicit gifts, and urge men to work for the upbuilding of the Association, and its funds. He related a recent occurrence that was very pleasing. A young man that had been given aid to complete his course of dental instructions that year, had been working as assistant, and also helping to keep his mother. He had saved twenty-five dollars, out of his earnings, which he returned to the Treasurer, asking him to deduct that from his account. He considered the aid as a loan,

and was returning the amount as he could spare from his earnings.

Mr. Robbins said there had been considerable work connected with the fund, there had also been a great deal of joy and this unexpected incident gave the Committee a great deal of pleasure.

While listening to him telling of the great humane work of a society of less than six hundred members, one felt humiliated and disheartened at the lack of interest shown by the dentists of the United States, in caring for aged and needy dentists, or assisting the widows and orphans left to the cold charity of the world.

He mentioned a plan of soliciting aid, by placing a printed card of appeal at every plate at the Branch Societies' dinners or luncheons, and at the grand annual banquet of the British Association. This plan was well received, and liberal contributions made to the fund which then amounted to nearly forty thousand dollars.

At the great meetings held in Chicago, Rochester, Asbury Park, and San Francisco, the past three years, Charity has not been our watch word; but with the New Year, I believe, will come an awakening, and with the earnest advocacy and work of the Journal, members of the Association will see, learn and realize, that unitedly they can easily, at a very slight sacrifice of time and money, in less than five years rejoice in an invested fund that will enable the Committee to give timely aid and comfort to the aged and unfortunates.

I enclose check for $18.00, which includes the one hour fee for Drs. James McManus, Charles and Henry, $5.00 each, and $3.00 for Christmas Seals.

Wishing you health and all the happiness the Holiday Season brings.

Very truly yours,

JAMES McMANUS, D. D. S.

IMPORTANT INFORMATION FROM THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

At the Annual Meeting of the Dental Protective Association of the United States, held at the Hotel La Salle in the City of Chicago, on Monday, December 20th, 1915, the Secretary was requested to prepare a plain statement for publication in the different dental Journals, giving such facts as would be of general interest to the profession, and setting forth the status of the members of the Association with reference to the pending Taggart litigation.

New List of Members in Good Standing.

During the past year the Board of Directors revised the list of members, eliminating from the new mailing list the names of those who were known to be dead, out of practice, or who did not pay the assessment levied in about 1898. On December 10th, 1915, the latter were notified and given an opportunity to place themselves in good standing in the Association by paying the $10.00 assessment. A few took advantage of this and remitted the amount; those who did not do so were dropped from the list.

Next to the Largest Dental Organization in the World.

The new list of members in good standing now contains the names of 8050 practicing dentists. These members are scattered geographically. A glance at the list would seem to reveal the fact that almost every town and city in the United States has one or more representatives in the Association. With the one exception of the re-organized National Dental Association, the Dental Protective

Association of the United States is the largest Dental Organization in the world; and the best feature of all is that the total assets, as reported by the Treasurer at the last Annual Meeting, amounts to $35,508.37. Of this amount $26,000.00 is invested in approved municipal bonds; $6000.00 is in individual notes secured by a corporation note for three times the amount; and the balance is in ready cash in a checking and savings account in the Northern Trust Company of Chicago.

Ready and Prepared to Defend Its Members.

Thus it will be seen that the Dental Protective Association of the United States is a live, healthy organization. standing ready, as it has always done in the past, to defend its members against the unjust demands of patentees whose claims are worthless.

The Association's Agreement with Doctor W. H. Taggart.

This brings us to a discussion of the status of our members with reference to the Taggart litigation. On December 5th, 1910, the Board of Directors of the Dental Protective Association of the United States recognizing the value of the Taggart Method of Casting, after much discussion and many conferences, entered into an agreement with Doctor W. H. Taggart, a member of the Association in good standing and the sole owner of certain patents on this new and original method of making dental inlays and the like, by the terms of which members of the Association could obtain the permission to practice the Taggart Method of Casting for the life-time of the patents (seventeen years) with any machine he may then be using for the cash sum of $15.00. This agreement also provided that any member of the profession who joined the Association within the time specified could procure such permission on the same terms. The time limit of this agreement expired, except for recent graduates, on February 9th, 1913.

Status of Recent Graduates.

A clause in the agreement provided as follows: "That those who entered the profession within one year from the date of the first court decision sustaining the validity of patents heretofore mentioned shall pay $15.00 for the permission to practice the Taggart Method of Casting; those that enter the profession from year to year thereafter shall have the fee reduced by as many dollars as the number of years elapsed since the first court decision sustaining the validity of said patents. One year from the date of graduating or entrance into the profession, in all cases, shall be given in which to pay the stipulated fee." The phrase "entrance into the profession" has been interpreted by the Attorney for the Association as meaning that an individual enters the profession when he takes the State Board examination, receives his license to practice and has it recorded, whether he actually begins practice at the time or not. This explanation is here given for the benefit of the many recent graduates who are desirous of information regarding their standing under the terms of the Association's agreement with Doctor Taggart.

Ownership of a Taggart Machine Carries With It the Permission to Use the Method.

During the time from December 5th, 1910, to February 9th, 1913, when the terms of the agreement were open to not only our members, but to the entire profession, there were over 4200 practicing dentists who availed themselves of the terms and paid the $15.00. At this time Doctor Taggart is offering his **casting machine** for sale. This could be purchased thru the Association for $75.00 cash, or direct for $100.00 cash. A great many of our members purchased the machine direct from Doctor Taggart before the agreement was made; a few subsequently purchased it thru the Association. A considerable number of den-

tists, who were not members of the Association, also purchased the machine direct. The right to use the Taggart Method of Casting went with the purchase of a machine from whatever source; and the ownership of a machine today carries with it the permission to use the method. This information is given and emphasized here for the benefit of those dentists who own a Taggart Casting Machine. Those of our members who purchased the machine must remember that whoever owns the machine today, no matter where or how it was purchased, holds the sole right to use the method. In other words a machine cannot be sold to another and the former owner retain the privilege of using the method.

Status of Members in Taggart Litigation.

This question is frequently asked: Where does the individual stand, with reference to the pending Taggart litigation, who is a member of this Association in good standing and who did not accept the terms of the agreement with Doctor Taggart before the time limit expired? In reply to this important question, we will say that every member was notified individually and thru the dental Journals, not only once but several times, of the opportunity afforded by the terms of the agreement; and those who did not accept **forfeited their right to protection from this source by this Association.** They are hereby so notified that they may either settle direct with Doctor Taggart or make whatever other arrangements they see fit to protect themselves from the Taggart patents.

The question has also been raised as to the right of a member of this Association, who did accept the terms of the agreement with Doctor Taggart, to join other Associations organized primarily to fight Doctor Taggart. Every member of the Dental Protective Association of the United States who accepted the $15.00 proposition, agreed by signing the by-laws, to abide by the same. Under Section XIII of said by-laws, the third paragraph reads as follows: "If said $15.00 be paid before the entry of any decree or judgment finding any of Doctor Taggart's patents mentioned above in said agreement valid or granting damages for infringement thereof, the member is free to practice the method with any machine he may then be using, and after the date of said decree or judgment, the member is not to purchase or use machines infringing Doctor Taggart's machine patents, except as aforesaid, and **no member of the Association is to defend or join in or contribute to the defense of any suit upon any of said patents while practicing the method under such permission from Doctor Taggart."** In this connection it may be stated that this agreement with Doctor Taggart was no voluntary effort on his part; and after he finally consented to what he felt was practically giving the method away ($15.00 for 17 years amounts to about 88 cents a year) he demanded this clause on the contention that he would not grant a man the right to use the method for practically nothing and leave him free to contribute several times the amount, if he so desired, to defeat him in court of his just due. The Board of Directors recognized the justice of this demand and consented to it. Thus this question is answered here in full.

May Dentists Now Join This Association?

It is frequently asked if the doors of the dental Protective Association of the United States are now closed to the profession, or if members of the profession may join at this time. In reply to this question we will say that, subject to the approval of the Board of Directors any member of the Dental Profession may become a member of the Association on payment to the Treasurer of a membership fee of $10.00, and subscribing to the by-laws of the Association; but it must

be with the distinct understanding that the time limit of the agreement with Doctor Taggart has expired, except, as previously mentioned, for recent graduates or those who have not been in the practice of dentistry for more than one year.

Why Dentists are Joining at This Time.

Tho no immunity can be offered by this Association at this time from Doctor Taggart, except to recent graduates; nevertheless, dentists are joining the Association for the protection afforded from other sources. There has scarcely been a time since 1888, when the Dental Protective Association of the United States was first organized, when the Association has not had pending more or less patent litigation. It has been successful in all of its suits to date. There must be a reason for this. We believe it is due to the fact that the Association was organized on the right basis; for the sole purpose of defending its members against abuse by patentees whose claims were worthless, and not to defraud any man of his just due. The United States government, thru its patent office, grants patents to individuals whom it believes has something worthy, new and original. In this manner it encourages inventive genius. It would be wrong for any Association to attempt to fight all patents, dental or otherwise, regardless of their merit. Such is not the policy of the Dental Protective Association of the United States, but let it be remembered, **that it stands today, as it has stood for nearly twenty-eight years, like a stone wall between its members and patent abuse.**

At the present time the Association is defending one of its members who has been sued for infringing a patent on a set of instruments for scaling teeth. In the opinion of the Board of Directors the principle involved in the patent, and on which it is based, is neither new nor original; and they felt that it would be dangerous for the members and the profession to have said patent validated in court. Therefore, they have directed the attorney to assume full defense of the suit on behalf of the Association.

In this brief article we have endeavored to cover and explain so far as possible, all points which may arise now that the Taggart and other litigation is pending, in order to thoroly inform the membership of the Association, and incidently others in the profession who may be interested; and to avoid unnecessary correspondence. However, should anyone want further information or desire to join the Association, they may address the Secretary, 39 South State Street, Chicago, Illinois.

By order of the Board of Directors.

J. G. REID, President.
J. P. BUCKLEY, V. Pres & Sec'y.
D. M. GALLIE, Treasurer.

Chicago, January 4, 1916.

THE OHIO STATE DENTAL SOCIETY.

The recent meeting of the Ohio State Dental Society, December 7-10, 1915, was one of unusual importance and interest, the result of conscientious preparation and successful execution. Combining the exercises incident to the dedication of the Miller Memorial Statue with the celebration of the Semi-Centennial of the Society's organization produced a program such as will seldom be equalled.

The program as announced in the last number of the Journal was carried out in every detail, save that illness prevented the presentation by Dr. Herman Prinz

of the result of his recent investigations. His place on the program was filled to the utmost satisfaction of his hearers by Dr. Thos. P. Hinman in a paper entitled "A Review of the Literature on Peri-Apical Infections and Root Surgery."

The President, Dr. Edward C. Mills, in his address reviewed the early history of the Society, called to mind the names of many who then were, or later became, noted in dental history; detailed recent efforts for legislative betterment and offered recommendations for the general good of the Society.

The leading papers by Drs. Geo. H. Wilson, Geo. E. Johnson, Chas. C. Voelker and J. H. J. Upham (M. D.) and the lecture by Dr. Weston A. Price were of the high order to be expected of their authors.

New features of the program were a series of brief papers without discussion, on topics of practical interest and a half day of "Descriptive Clinics" presented before the entire body by each clinician in turn, the lantern being used for illustration and instruction. These features prove to be exceptionally popular.

The miscellaneous clinics were numerous and instructive; the exhibits more diversified and artistically displayed than is customary.

Much credit is due the Committee on Arrangements for their thoro preparation for all features of the meeting.

On Wednesday afternoon the Willoughby D. Miller statue was unveiled by a grand niece of Dr. Miller in the presence of several hundred spectators. The statue, by Frederick Hibbard, of Chicago, is beautifully situated on the campus of the Ohio State University in close proximity to the Library building. By those who knew Dr. Miller the likeness is pronounced excellent and as a work of art is worthy of the man it honors, of the place it occupies and of those who made its erection possible.

Following the unveiling, the audience gathered in the University Chapel to listen to impressive addresses by Drs. E. C. Kirk, N. S. Hoff, Thos. P. Hinman and T. W. Brophy and Prof. G. W. Knight, of the University, who knew Dr. Miller as a fellow student, fraternity brother and, later in life, as a personal friend in Germany.

In recognition of the important work being done by the Research Institute of the National Dental Association, the Society made a donation to this cause of $4000.00; to the American Hospital in Paris, $100.00; to the Ohio Dental Library, jointly maintained by the Ohio State and the Columbus Dental Societies, $200.00, and to the work of of the Committee on Oral Hygiene for the coming year, $1000.00.

These extraordinary appropriations have been made possible only by pursuing a policy of economy for years, awaiting the time when some great need or worthy cause could be adequately met.

On Thursday evening a banquet was served at which a number of toasts of an entirely informal character were thoroly enjoyed.

Among those responding especial mention should be made of Dr. Otto U. King, Don M. Gallie, T. P. Brophy, E. C. Kirk, C. G. Voelker, W. A. Price, H. C. Brown, J. H. J. Upham and Prof. G. W. Knight.

A pleasing feature of the evening was the presentation to Dr. J. R. Callahan of a complete Wappler X-Ray machine from personal friends in the Society, the presentation being happily made by Dr. Weston A. Price.

The business affairs of the Society are administered by a Board of Directors made up of the officers, **ex-officio**, three at large elected by the Society and members elected by the Components in proportion to their membership.

Dr. T. I. Way, of Cincinnati, as President, will guide the destinies of the Society thru the coming year. Other officers elected were Drs. F. M. Casto, First

Vice President; Z. N. Wright, Second Vice President; F. R. Chapman, Secretary; S. D. Ruggles, Treasurer and, as directors, Drs. J. R. Callahan, H. C. Brown and L. L. Barber.

The next meeting will be in Dayton on the first Tuesday of December, 1916, and the committees are already at work to equal or surpass the success of the late meeting. F. R. C.

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS.

By J. W. Beach, D. D. S., Buffalo, N. Y.

There are some very vital lessons to be learned by the dentists of the United States from the European War.

First, the part played by dentists in the present was is one of untold value in the wonderful service they are performing in the ambulance and hospital work, the necessity for which no other war has ever developed to the same extent. Modern trench warfare produces more wounds of the mouth and face than have ever been observed in previous wars, and the skilled dental surgeons in Europe have been able to occupy an unique field in his treatment of these wounds, the reduction of fractures, prosthetic restoration of lost parts, special oral surgery of the plastic variety, transplanta tion of bone, etc.

Second, the dental profession of the United States is **not prepared to render efficient service** to their **country** in **case** of **emergency.**

The relative importance of the dentist in times of war is unquestioned. All the recruits should pass thru his hands prior to enlistment in order that the enlisted men may have their mouths and teeth in proper order for such an emergency, and the best results in treatment of the wounds of the face affecting the jaws can only be obtained thru the skill and co-operation of the **dental oral surgeon.**

To meet this condition of unpreparedness on the part of the dental profession for such a serious emergency as war, the Preparedness League of American Dentists has been organized, the object being of a humanitarian, educational, and patriotic nature.

The **opportunity** has arrived when the dentist should at least profit by the lessons of the European war for the benefit of humanity, even if the United States is fortunate enough to be free from such a calamity as war.

THE PREPAREDNESS LEAGUE OF AMERICAN DENTISTS was organized to supply the means whereby the dentists may render adequate service to their country in times of peace or war.

PRIMARY OBJECT.

Its primary object, therefore, is to maintain a registration bureau for all dentists of the United States who agree to prepare the mouth of at least one worthy applicant to meet the requirements for enlistment, subject to such rules as shall protect the dentist from imposition. No further obligation is entailed thru registration, the object being purely one of voluntary service on the part of the members of the League in a cause that should appeal to all from its humanitarian and patriotic motive.

No one can gainsay that the duty of the dental profession is to put itself in readiness to adequately meet such conditions as prevail in the ambulance hospitals of combating nations, due to the

terrible havoc wrought by shrapnel and bomb in trench fighting.

SECONDARY SUBJECTS.

In view of the foregoing, the League proposes as a secondary object to establish sectional units in various cities thruout our country where those who desire will receive instruction and practice in special oral surgery, such as reducing fractures; restorations, both surgical and mechanical; construction and placement of orthodontic fracture bands and fixation splints; in fact, everything that will develop adequate service in peace or war.

Especial attention will be paid to the co-operative instruction of oral surgeons, orthodontists, and prosthodontists because of their intimate association and interdependence relative to the work that may be required of them. Dentists who have served in the American and other ambulance hospitals of Europe, and others of known ability in their special branches will assist in the work.

A **final result** of the dental oral surgeons work in European hospitals can not do otherwise than advance oral surgery. It is a well known fact that this branch of dentistry has been woefully neglected, and claims a smaller percentage of skilled operators than any other department of dentistry. It is safe to estimate that seventy-five per cent of the oral surgery done in this country is taken care of by general surgeons who have not had the opportunity of acquiring the technical knowledge which the dentist has obtained thru the intimate association of every day practice upon the teeth and jaws. We, therefore, believe the dentists to be peculiarly adapted and logically fitted to become the oral surgeon.

The European war has really created and developed a **new oral** surgery and the League will serve as the medium thru which all our resources may be combined to elevate American oral surgery to the highest standard of efficiency. It is the natural avenue thru which our special service may secure merited recognition and equal co-operation of the medical profession.

The permanent organization of the League will soon be formed and a fee of one dollar ($1.00) is asked of active members. An associate member may be registered without fee. A subscription fund may be obtained later on to meet the expenses of instruction at the different units. A circular letter has been sent to members of the dental societies thruout the United States and articles are being published in dental journals as fast as possible.

The Preparedness League is receiving the hearty support of leading dentists, including the President and Secretary of the National Dental Association, dental societies, institutions and clubs. The headquarters of the League are at No. 3 Professional Building, Buffalo, N. Y.

SPECIAL INFORMATION RELATIVE TO THE LEAGUE.

The organizers of the League wish it to be distinctly understood that it has no connection with any other organization and that all its efforts are confined within the circle of the dental profession. Associate members are as welcome as those who send the fee, for it is the moral support of the dentists that encourages those who are doing the work. All moneys received go to cover actual outlay and there is an average of rather less than twenty-five per cent. who become active members, and the amount received barely meets the cost of printing and postage.

An effort is made by the organizers to impress the profession that the movement is: "For the profession, of the profession and for our country if need be." The whole effort of the League is to prepare **against** war, inspired by an incentive to aid the dentist the better to serve his patients in every way possible.

These are the prime reasons for establishing units at different points thruout the country to study the new oral surgery and should exigencies demand, many more dentists will be prepared to efficiently assist our country if they wish to do so.

Several state, district and local societies have endorsed the objects of the League and are in accord with its principles.

Committee on Organization — Chairman, J. W. Beach, Buffalo; Vice Chairman, H. A. Pullen, Buffalo; Sec.-Treas., M. B. Eshleman, Buffalo.

Trustees—T. P. Hinman, Atlanta, Ga.; Otto U. King, Huntington, Ind.; F. W. Low, Buffalo; H. J. Burkhart, Batavia, N. Y., Chairman.

AMERICAN NATIONAL COMMITTEE FOR THE FOUNDATION OF A SPECIAL AMERICAN HOSPITAL IN PARIS FOR WOUNDS OF THE FACE AND JAW.

New York Executive Board—Dr. Herbert L. Wheeler, Chairman, 560 Fifth Avenue, New York; Dr. F. W. Murray, Vice-Chairman, 32 West 39th St., New York; Dr. D. Bryson Delavan, 40 East 41st St., New York; Dr. Wm. B. Dunning, 140 West 57th St., New York; Ethelbert I. Low, 30 Broad St., New York; F. L. Hine, Treasurer, 2 Wall St., New York, Pres. First National Bank; J. W. McConaughy, Secretary, 8 West 40th St., New York, Munsey's Magazine.

Paris Executive Board—J. H. Spaulding, D. D. S., President, 33 Boulevard Malesherbes, Paris; I. B. Davenport, M. D., M. D. S., Vice-President, 30 Avenue De L'Opera, Paris; Ch. Van Enter, treasurer, 2-4 Rue De La Banque, Paris; J. L. André Bonnet, M. S. A., Ch., D., Home Secretary, 3 Rue Laribe, Paris; R. Anema, Tm., D. D. S., Ch. D., Foreign Secretary, 172 Boulevard Haussmann, Paris.

Paris Committee—Wm. J. Younger, M. D., Ch. D.; H. Morestin, M. D.; F. W. Williams, D. D. S., Ch. D.; I. B. Davenport, M. D., M. D. S., F. J. Wilson, D. D. S., Ch. D.; Ch. Van Enter, J. H. Spaulding, D. D. S.; J. L. André Bonnet, M. S. A., Ch. D.; R. Anema, Tm., D. D. S., Ch. D.

New York Committee—H. W. Gillett, D. M. D.; D. Bryson Delavan, M. D.; Wm. B. Dunning, D. D. S.; Frank S. Hastings, F. C. Kemple, D. D. S.; Chas. Langdon Gibson, M. D.; F. L. Hine; John A. Wyeth, M. D.; Herbert L. Wheeler, D. D. S.; James F. McKernon, M. D.; W. D. Tracy, D. D. S.; J. W. McConaughy; F. W. Murray, M. D.; Ethelbert I. Low.

Patrons—Miss Mabel T. Boardman, American Red Cross Society, Washington, D. C.; Maj. Gen. William C. Gorgas, Surgeon General U. S. A., Washington, D. C.; D. Bryson Delavan, M. D.; late President American Laryngological Association; Truman W. Brophy, M. D., D. D. S., LL.D., Sc. D., F. A. C. S. Chicago, Ill.; Samuel W. Lambert, M. D., Dean Coll. Phys. & Surg., Columbia University, New York; Geo. W. Crile, M. D., Cleveland, Ohio; Harvey W. Cushing, M. D., Prof. Harvard Medical School, Boston, Mass.; Wm. Carr, A. M., M. D., D. D. S., Dean New York College of Dental and Oral Surgery; British War Relief Association, Inc., 542 Fifth Ave., New York.

WILL YOU HELP TO REBUILD MUTILATED HUMAN FACES.

An Earnest Appeal for Your Aid in Establishing a Hospital to Save Thousands of Brave Men from Revolting Disfigurement.

The humane people whose names appear at the top of this letter are asking your aid.

Your help is needed in the great work of restoring horribly mutilated human brothers to the semblance of human beings.

In the first twelve months of the war the official reports show 6,490,000 wounded. In this terrible sum of human misery there has been little time to think of after effects.

It is comparatively nothing that part of a man's face is shot away. If his life is not in danger he must leave the hospital as soon as possible to make room for a new victim.

Altho because of the character of trench warfare, the number of facial wounds has been in proportion far greater than in any other war, the accommodations, as to hospital space, are badly lacking.

After first treatments they are now crowded out because the room is all imperatively necessary in the never-ending battle to save life.

And there is no hospital devoted entirely to the full treatment of these wounds, altho several institutions are now carrying on the work to the limit of their necessarily limited capacity.

The consequence is that a heroic young man may go out into the world in possession of his strength and all his faculties, but with so revolting an appearance that people shrink from him on the street.

Noses are blown off; cheek bones crushed, upper jaws caved in and lower jaws shot away, but there is no time for any treatment except to prevent infection. With few exceptions the delicate rebuilding work must be entirely neglected. There is no time, no place.

One young man was brought back from the firing-line with nothing to show that he had ever had a face excepting two slits under the eyebrows and a few teeth in the lower jaw. Where his face had been was what looked like the crater of some horrible volcano, but he wrote with a pencil. "Don't worry about me. I still have my sight."

With a little help from you and other humane Americans thousands of these young men can be sent back into the world with nothing but a few scars to show. The committee has printed photographs showing these wounds before and after they have been treated by Dr. Morestin, the famous facial surgeon, who has been called "the sculptor of human flesh." It was decided that the "before" were too frightful to be sent broadcast thru the country, but if you desire, the person who sends you this appeal can arrange for you to see them.

The greatest facial surgeons in the world have contributed their services to a hospital to be established in Paris for the treatment of these wounds. The French War Office has offered a suitable building. The American Red Cross will supply disinfectants, gauze, bandages, cotton, and other hospital supplies.

It has also given $2,000 in cash and may be of future assistance.

For each $20,000 the committee can establish and maintain one hundred beds. Even one hundred beds will do a great work. Five hundred will do wonders.

Won't you help, if even only a little?

You can send your contributions to the American Red Cross, Washington, D. C., or to the treasurer of the American committee, F. L. Hine, President First National Bank, No. 2 Wall Street, New York City. Be sure to fill out and enclose with check or money order a form subscription blank (suggestion below) that your contribution will go to the fund for the Special American Hospital in Paris for Wounds of the Face and Jaw.

To The American Red Cross,* Washington D. C., or F. L. Hine, First National Bank, No. 2 Wall Street, New York.

Enclosed herewith is my contribution, $....., to the fund for the **Special American Hospital in Paris for Wounds of the Face and Jaw.**

(Signed) .....

MEMBERS OF COMMITTEE.

Atlanta, Ga.—Dr. S. L. Silverman, Chairman, 604 Fourth National Bank Building; Dr. Wm. Chisholm, Anderson, S. C.

Boston, Mass.—Dr. C. M. Proctor, Chairman, 419 Boylston St.; Dr. W. E. Boardman, 419 Boylston St.

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Kansas City, Mo.—Dr. C. C. Allan, Chairman, 10th & Troost Sts.

*Note—Would suggest you write a new form instead of cutting this one out and thus mutilating The Journal.

Louisville, Ky.—Dr. Harry B. Tileston, Chairman, 916 Starkes Building; Dr. F. W. Rounds, 919 Starks Building; Dr. F. R. Wilder, 717 Starks Building.

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AMERICAN HOSPITAL IN PARIS.

By Herbert L. Wheeler, D. D. S., New York City.

I am glad to report that thru the Committees in the various cities (which cities and names of committees I am sending to you with this) we have raised at present over thirty thousand dollars, and I have on deposit in New York City for the Special American Hospital for Wounds of the Face and Jaw in Paris $29,492, besides other funds which I know of that are not in my hands. This work has only just begun.

The Committee in Paris (the names of which you will find on above) are at work at the present time establishing this new hospital. The last letter which I had from Dr. Anema, he and Dr. Spaulding, the president of the Executive Committee in Paris, were to have an audience the next day with the Minister of War, and things were going all right.

It seems that, in order to get the best work for this plastic surgery, some of the surgical work has to be done and then a period of rest must intervene, and it is the desire of the Committee in Paris to have not only a hospital of one hundred beds to start with, but also to have a place where those who need it can be kept during the period of rest, and supplied with bed and board until they can again be put upon the operating table. These will be the two chief objects for which money will be needed.

As you know, a large proportion of the money was raised in Wilmington, Delaware, thru the efforts of members of the DuPont family, and the DuPonts have kindly asked their representative in Paris, M. Duclos, to serve as a member of the Board of Trustees, and he has consented to do so. This, of course, will be a great help in having someone acquainted with the conditions in Paris and with financial affairs.

It is evident that there was some misunderstanding concerning the desire of the Central Committee in the matter of raising funds. We do wish the dentists to contribute all they can and we appreciate the great generosity thus far of the profession, but our desire has been to have the members of the Committee in each locality, and other dentists who will work with them, send copies of the circular to their friends and patients, with a personal note, stating that they know this to be a worthy institution and asking for contributions of any amount. We have received to date amounts ranging from $1.00 to $5000.00, many contributions of $5.00 and of course, a great many of $100.00, $200.00 and $500.00. If this policy of having the various committees and their friends in the dental profession send out the circulars to their friends and acquaintances is carried out,

I am sure a great deal of money can be collected. Without sending out any personal letters at all, and merely showing the circular to friends and patients, I have obtained from them $1000.00 in contributions, and I think the other members of the New York Committee have done quite as well.

This will be the first hospital established, so far as I know, in which the dental profession is equally and fully represented as the medical profession, and I think we can, without exaggeration, say it is clearly more nearly a dental institution than any of the others. That does not mean that good dental work is not being done at a number of other institutions in France. It is, and it is needed. If there were one hundred such institutions established this very moment, they could not cope with the situation there.

FINAL REPORT OF AMERICAN MILLER MEMORIAL COMMITTEE.

The following is the final report of the American Miller Memorial Committee:

Contributions by States.

Alabama	$ 25.00	N. Hampshire.	25.00
Arizona	25.00	New Mexico.	25.00
Arkansas	50.00	New York	125.00
California	60.00	So. Carolina	25.00
Colorado	82.00	No. Dakota.	50.00
Connecticut	100.00	So. Dakota	15.00
Florida	25.00	Ohio	1303.00
Georgia	60.00	Oklahoma	31.00
Illinois	531.00	Oregon	50.00
Indiana	75.00	Pennsylvania	220.00
Iowa	200.00	Tennessee	50.00
Kansas	134.50	Texas	50.00
Kentucky	105.00	Utah	14.00
Maine	25.00	Vermont	20.00
Massachus'ts.	100.00	Virginia	50.00
Michigan	300.00	W. Virginia.	25.00
Minnesota	100.00	Washington.	50.00
Missouri	100.00	Wisconsin	25.00
Montana	15.00	Wyoming	10.00
Nebraska	100.00		

Total	$4,375.50
Interest on fund to Dec. 1, '15	667.33
Grand total	$5,042.83

To F. C. Hibbard, Sculptor	$5,000.00
Balance	$ 42.83

The expense of the Memorial Committee was $275.12, which amount was paid out of the treasury of the Ohio State Dental Society in addition to the $1,000 subscribed by this society.

The balance of $42.83 was turned into the treasury of the State society as a partial reimbursement for the expense of the Memorial Committee.

EDWARD C. MILLS,
Columbus, Chairman.

JOHN R. CALLIHAN,
Cincinnati.

STEWART D. RUGGLES,
Portsmouth.

WESTON A. PRICE,
Cleveland, Treasurer.
Memorial Committee.

LEGISLATIVE DEPARTMENT.

NEW LEGISLATION EFFECTING THE ARMY DENTAL CORPS.

By Homer C. Brown, D. D. S., Columbus, Ohio, Chairman Legislative Committee N. D. A.

AFTER a long and strenuous effort, the Army Reorganization Bill has passed Congress and been signed by the President. Incorporated in this is the following provision relating to the Army Dental Corps:

"The President is hereby authorized to appoint and commission, by and with the advice and consent of the Senate, dental surgeons, who are citizens of the United States between the ages of twenty-one and twenty-seven years, at the rate of one for each one thousand enlisted men of the line of the Army. Dental surgeons shall have the rank, pay, and allowances of first lieutenants until they have completed eight years' service. Dental surgeons of more than eight but less than twenty-four years' service shall, subject to such examination as the President may prescribe, have the rank, pay, and allowances of captains. Dental surgeons of more than twenty-four years' service shall, subject to such examination as the President may prescribe, have the rank, pay and allowances of major: **Provided,** That the total number of dental surgeons with rank, pay, and allowances of major shall not at any time exceed fifteen: **And provided further,** That all laws relating to the examination of officers of the Medical Corps for promotion shall be applicable to dental surgeons."

It will be noted that this does not contain all the provisions recommended and strongly supported by the Legislative Committee of the National Dental Association. However, it should be recognized that all legislation is more or less a question of compromise and in view of this, we should accept what has been secured as a very decided improvement over the present conditions.

The following brief data may be interesting: In 1901 Congress passed an act providing for an Army Dental Corps, the members of which served as contract dental surgeons until 1911, when under specific conditions, the rank of first lieutenant was provided for them. At the present time there are seventy-five members in the Corps. thirty-six first lieutenants and thirty-nine acting dental surgeons. When the new legislation becomes operative, up to its full quota, there will be approximately 200 members in the Corps. This is on a basis of "one to each one thousand men in the line of the army." This is on a basis of an army of 211,000 allowing them 11,000 non-combatant officers, altho these officers may be slightly in excess of this number.

In view of the improved conditions the future of this service will be decidedly more attractive and should strongly appeal to the dental graduates of today and stimulate the members of the Corps to

develop it to its highest possible efficiency.

For the benefit of those not familiar with the procedure in securing this improved legislation, I think all who have been in close touch with its progress fully appreciate this has not been accomplished without a strong fight and many sacrifices, on the part of a goodly number of persons. In due time we expect to make a public acknowledgement to those who have loyally co-operated and made possible that which has been secured.

CONGRESSIONAL RECORDS ON SENATOR POMERENE'S AMENDMENT.

From Congressional Record, Pages 6964 to 6968, April 14, 1916.

MR. POMERENE. Mr. President, the bill as presented by the Senate Military Committee provides for giving to members of the Dental Corps the pay and allowances of lieutenant or captain or major. Under the law as it exists today members of the Dental Corps are entitled to the rank of lieutenant. Under the amendment I have offered members of the Dental Corps will be given the pay, allowances, and rank of either lieutenant, captain, or major, under the terms and conditions provided in the amendment, which are substantially the same as those in the Senate committee substitute, save perhaps that there has been a change as to the length of time which they must serve before they may be entitled to promotions. Those promotions are to be granted upon examination.

Mr. President, under the law as it exists today, and under the substitute as reported to the Senate by the Senate committee, members of the Medical Corps are entitled to the rank and pay of lieutenant, captain, major, lieutenant colonel, colonel, and major general. We are only asking, by this amendment, that the dental surgeons be entitled, under the conditions provided, to the rank of lieutenant, captain, or major. I notice in examining the bill that chaplains are given the rank, as well as the pay and allowances, of certain officers; and I do not quite understand why the dental profession should be discriminated against.

Senators are well aware of the very great advance which has been made by the dental profession in the last 50 years. We see in the newspapers today many accounts of the wonderful work which dental surgeons are performing in the hospitals and on the field of battle in Europe; and it has seemed to me that one of the reasons which heretofore has made medical work or dental work attractive to members of those professions is not so much the pay as it is perhaps the rank which is conferred upon its members under the statutory provisions now in vogue. Nearly every man who enters the Dental Corps, if he were simply seeking the financial emoluments connected with the office, could do better in his private practice; but he will be attracted by the fact that he may be entitled to some official rank. Some men may not regard that as of very much importance, but others do. The question of rank seems to be a matter of very great importance to the medical profession; and I would not be understood for one moment as attempting to decry the merits of that profession; but the dental profession is entitled to some recognition, as well. We are interested in having the Dental Corps so attractive

that it will bring to it the best of the young men in that profession; and if we are going to deny to them the right of rank, certainly we are going to detract from the service itself. Let us encourage rather than discourage the young men of the great dental profession.

MR. GALLINGER. Mr. President, will the Senator from Ohio permit me a question?

MR. POMERENE. I will.

MR. GALLINGER. Will the Senator state, for my information, and perhaps for the information of other Senators also, how high a rank is conferred upon chaplains in the Army?

MR. POMERENE. It is only my impression, but I think the rank of captain is conferred upon them. I am not, however, certain about that; the bill itself provides that they are entitled to that rank, is my impression; but I would not state it as a fact.

I hope, Mr. President, the Senate will adopt the amendment which I have proposed, so that the dental profession may not be discriminated against.

MR. THOMAS. Mr. President—

THE VICE PRESIDENT. Does the Senator from Ohio yield to the Senator from Colorado?

MR. POMERENE. I do.

MR. THOMAS. I should like to ask the Senator from Ohio, before he takes his seat, if he would not be satisfied with the provision which is found in the House bill upon this subject? He will find it on page 17 of the bill as it came from the House. My impression is that is a well-considered proviso, and is preferable both to his proposed amendment and to the provision of the Senate bill.

MR. POMERENE. As I recall that provision, it gives to the members of the Medical Corps the rank of captain—

MR. THOMAS. Yes.

MR. POMERENE. And also the rank of major?

MR. THOMAS. No.

MR. POMERENE. Well, Mr. President, of course it would be very much better that dentists be entitled to the rank of either lieutenant or captain, or both, than not to receive any recognition at all; but, in view of the fact that the Medical Corps receives these very much higher ranks—and I am not contesting the justice of that provision at all—the Senate might very readily consent to give to the dentists these three grades.

MR. LODGE. Mr. President—

THE VICE PRESIDENT. The Senator from Massachusetts.

MR. SHAFROTH. Mr. President, I should like to ask the Senator from Ohio a question before he takes his seat, and that is whether or not the provisions of the Senator's amendment increase the pay, or whether the dental surgeons now get the pay of lieutenant, captain, and major?

MR. POMERENE. I am not sure as to that.

MR. LODGE. No; it does not increase their pay. I understand they receive longevity pay.

MR. CHAMBERLAIN. If I may answer the Senator, I will say that the amendment of the Senator from Ohio not only increases the rank that the dental surgeons now have, but with each increase in rank the pay increases, of course.

MR. LODGE. But do they not now receive a longevity increase?

MR. CHAMBERLAIN. Only in the grade of first lieutenant; that is all.

MR. LODGE. There is no longevity increase after that?

MR. CHAMBERLAIN. Not as I understand. I will say to the Senator that the maximum pay which the dental surgeons now receive under the law is $2,800 and allowances for quarters, heat and light, which are equivalent to $450, making $3,250 as the amount which they

get under the present law. Under the Senate bill the maximum pay is $4,000, with allowances amounting to $950.

MR. LODGE. But, Mr. President, I think the Senator misunderstood me. The amendment of the Senator from Ohio does not increase the pay proposed by the bill.

MR. CHAMBERLAIN. No; but there is this difference, I will say to the Senator, that the proposal of the Senator from Ohio is to give them rank as well as increase of pay.

MR. LODGE. Certainly.

MR. CHAMBERLAIN. And the amendment shortens the length of time they must serve to get the increase.

MR. LODGE. But the amendment does not increase the pay which dental surgeons get under the bill, which, as reported by the committee, does not give them rank.

MR. CHAMBERLAIN. No; I think not.

MR. LODGE. That is what I said.

MR. CLARK, of Wyoming. On what page of the bill is the provision?

MR. LODGE. Page 116. Was I recognized, Mr. President?

THE VICE PRESIDENT. The Senator is recognized now. His 10 minutes will now start.

MR. LODGE. Mr. President, I shall not consume all of my time. The bill, as it stands, gives dental surgeons the pay and allowances of first lieutenants until they have accomplished 10 years' service, after 10 years' service, and up to 25 years' service they receive the pay and allowances of captain; and after more than 25 years' service they receive the pay and allowances of major. The proposition of the Senator from Ohio, as I understand, is simply to give them the rank. It provides that—

The President is hereby authorized to appoint and commission—

And so forth. The pending bill does not give them rank, altho it gives them the pay and allowances for the rank.

Mr. President, during the many years which I have been here the question between staff and line has been frequently before both bodies and before committees on which I have served. I was never a friend in those days of giving high rank to the various divisions of the staff; but Congress always seemed to differ from me in that respect, and seemed always to have a great feeling of favor for the staff, and the question now seems to be well settled. The highest rank has been to the surgeons, to the paymasters, to the civil engineers in the Navy, and so on.

MR. OVERMAN. And to chaplains.

MR. LODGE. And to chaplains. Congress gave the relative rank, as it used to be called, to the different branches of the staff. That being the case and the policy being well settled, it seems to me a very unfair discrimination to leave out the Dental Corps, which has been established within the last 10 or 15 years in the Army.

The men who form that corps are necessarily highly educated. Their course during their first year at that medical school is the same as that taken by the men who intend to be surgeons and physicians; and then, as a rule, they are required to spend at least two years in a dental college. They are as I have said, highly educated, and their branch of the medical profession has been constantly assuming a greater importance. They are subjected to severe examinations, and they have, to my mind, every qualification for rank that the Medical Corps has.

Of late years particularly, as we are all aware, there has been a very great development, indeed, in dental surgery. The Senator from Ohio has referred to the present war in Europe. As we all know, under the conditions of the present war face wounds and head wounds,

owing to the explosive shells, are extremely common.

MR. GALLINGER. And they are very severe.

MR. LODGE. And they are very severe. There have been some most extraordinary benefits conferred on the wounded men by the application of the principles of dental surgery. There have been cases here in our own country where soldiers who have been badly shot in the head and face have been greatly relieved by mechanical dentistry; and that branch of the science has reached a very high point. There is a Harvard unit at this moment serving in France, and in the French hospitals their work has been widely noted. American dental surgery has always stood at the head of the dental profession everywhere in the world.

Now, as we have established this matter of staff and rank, and given high rank to paymasters, to members of the Medical Corps, and to chaplains, and, in the Navy, to civil engineers, giving such officers in some of these corps in the Army the rank of brigadier general and major general, and giving paymasters in the Navy the rank of admiral, it seems to me the very modest rank proposed to be given in the amendment of the Senator from Ohio to the members of the dental profession is only fair, if we give rank to the staff corps at all. I think they ought to be included, and I hope the committee will accept the amendment of the Senator from Ohio proposing to give rank to the members of the Dental Corps.

MR. CHAMBERLAIN. Mr. President. may I call the attention of the Senate to what the effect of the amendment will be? As the law stands now, dental surgeons have the rank, pay, and allowances of a first lieutenant. That is the highest rank that they have. The Senate bill, as is has been reported to the Senate, cuts out the provision giving them the rank of lieutenant, but gives them the pay and allowances of a lieutenant, of a captain, and of a major in due course, as they are promoted. As they serve a sufficient length of time they are promoted so that they receive pay and allowances but not rank from lieutenant to captain and from captain to major. The highest pay and allowances which dental surgeons will get under the Senate bill are those of a major.

Now, let me call the attention of the Senate to just one thing in that connection. Under the law which is proposed by the Committee on Military Affairs dental surgeons will have to serve 10 years as first lieutenants before they can be promoted and obtain the pay of captain, and they will have to serve 25 years before they can be promoted to the rank and obtain the pay of major. The amendment of the Senator from Ohio shortens those periods so that a man can be promoted from a lieutenant to a captain after 5 years and promoted to major after 15 years. They therefore will attain a higher rank in 15 years than it is possible for a man in the line sometimes to attain.

Mr. LODGE. May I ask the Senator a question?

MR. CHAMBERLAIN. Yes, sir.

MR. LODGE. The bill reported by the Senator very greatly increases their pay and allowances?

MR. CHAMBERLAIN. Very greatly.

MR. LODGE. But that bill takes from them the rank they now enjoy?

MR. CHAMBERLAIN. Yes, sir.

MR. LODGE. I have not carefully examined the amendment of the Senator from Ohio, and I did not know that the intervals were shortened by the amendment.

MR. CHAMBERLAIN. They are.

MR. LODGE. I do not think that is essential, but I do think they ought to have recognition of rank.

MR. CHAMBERLAIN. We have benefited their condition very materially, but have not given them increased rank.

MR. BORAH. Mr. President, the practical working of the proposal to shorten the time they must serve before they can move up is to increase their pay.

MR. CHAMBERLAIN. Certainly; it increases it very materially.

MR. HARDWICK. Mr. President, if the Senator will yield for a question, would the Senator be willing to give them the rank as well as the pay and allowances according to the plan which the committee has worked out in the bill?

MR. CHAMBERLAIN. I really do not think they ought to have it at all, Mr. President. If I had to go over the whole field again and start anew, I do not think any of the noncombatant forces ought to have rank; but we have heretofore started out by giving rank. Rank has been given to dental surgeons; it has been given to chaplains; it has been given to the Medical Corps, altho none of these corps, except the Medical Corps, command troops. The result is frequently seen in the promotion so rapidly of a noncombatant, of a man who is confined to his office, that he goes away ahead of a man who has had to fight his way up to a higher grade.

MR. CLARK, of Wyoming. What is the motive in taking away rank from the Dental Corps?

MR. CHAMBERLAIN. As compensation for that the committee has given them the pay and allowances of major.

MR. CLARK, of Wyoming. But at whose suggestion was this trade made—of rank for compensation?

MR. CHAMBERLAIN. I do not know that anybody suggested it. I think it was along the line of the thought of the committee that they ought not to have any rank. It is the same way with the veterinarians. We have the same problem to meet there. The fact is that every civilian force that crowds its way into the Army asks for rank.

MR. CLARK, of Wyoming. What I can not understand is just why the committee should select the Dental Corps, deprive them of rank, and make a horrible example of them, leaving the other noncombatant corps intact as to rank. It does not seem like a square deal to me.

MR. CHAMBERLAIN. Perhaps not. I realize fully what the Senator from Massachusetts (Mr. Lodge) has said, that in the modern method of trench fighting many of the wounds are above the shoulder, and dentists have done a great work in relieving the sufferings of those men so wounded; but dentists do not command.

MR. LODGE. Neither do doctors.

MR. CHAMBERLAIN. Doctors in the Army do command.

MR. OVERMAN. Chaplains do not.

MR. HARDWICK. And paymasters do not.

MR. LODGE. Chaplains and paymasters do not command.

MR. CHAMBERLAIN. There are a lot of men who have rank who ought not to have it; but when you start along that line it is difficult to stop.

MR. CLARK, of Wyoming. My question is, if you are going to take rank from one corps, why not take it away from all of them and, as the Senator says, make a scientific sweep of it?

MR. CHAMBERLAIN. Possibly the Senator will help us to do that now?

MR. CLARK, of Wyoming. Not at all. I consider that the Dental Corps ranks up with the Medical Corps, so far as service in actual strife is concerned; and I think their service in time of peace is very important—as important as is the service of the surgeons—and it is growing greater and greater in importance all the time. It occurs to me that taking away the rank which they already have

and seeking to compensate them with additional pay is making an example of the Dental Corps apart and alone from the other corps, and it looks like—I do not say it is—but it looks like somebody was working somehow against the Dental Corps and not against the system of noncombatant rank.

MR. DU PONT. Mr. President, the whole matter at issue, as I see it, is a question of a fair deal to all concerned. The relative claims of the different branches of the staff have been brought forward with great persistency, and from all of them comes a demand for more pay, more rank, and more allowances, while the fighting force of the Army, who make no demands, are treated unfairly.

Take the case of the Dental Corps. A man enters the Army as a first lieutenant, and with this rank he is able, when he goes into a garrison, to turn every second lieutenant out of his quarters. In 10 years he becomes a captain. A young man may be 25 or 26 years old when he enters the Dental Corps of the Army and officers of his own age, who belong to the fighting force, have not by any means reached that rank. The ordinary course of promotion in the line averages from 12 to 14 years. It will be seen, then, that the noncombatant officers have an immense advantage over the part of the Army that does the fighting, the real bone and sinew of the Army; and I for one do not think that this is a fair proposition. Give them, if you please, equal consideration and equal advantages, but do not give them more. The members of the Dental Corps, as I understand it, are asking for increased rank. They were formerly only first lieutenants, and now they want to be captains and majors. The committee has felt that if anything was to be done for them it should be done for them on the lines set forth in the bill. We gave them a substantial increase in their pay, and we thought that was just and equitable to all concerned.

MR. CLARK, of Wyoming. Mr. President, may I ask the Senator a question?

MR. DU PONT. I have concluded.

MR. CLARK, of Wyoming. I should like to ask the Senator a question.

MR. DU PONT. Certainly.

MR. CLARK, of Wyoming. What was the reason for taking away the rank of first lieutenant, which they now have?

MR. DU PONT. On the general principle that they should not have had any rank in the beginning; and it was thought, as the question of pay was a very vital and important one, that after they had served in the Army for a certain length of time they were entitled to more pay, as other staff officers get. But, then, if you are to give them rank insist upon longer service as a prerequisite. Do not foist them into the different grades over everybody else's head.

MR. LODGE. That is not proposed.

MR. CLARK, of Wyoming. I should like to ask the Senator another question. If the right theory is to deprive the Dental Corps of rank, why, in order to be consistent, did not the reform touch the Pay Corps and the Medical Corps the same as the Dental Corps?

MR. LODGE. They have covered the Pay Corps in the Quartermaster's Department.

MR. DU PONT. There is no such thing as a Pay Corps in the Army. The only analogous corps are the veterinarians and the chaplains.

MR. LODGE. And you put the dentists on the level of the veterinarians?

MR. DU PONT. The veterinarians today think they are on the level of the dentists.

MR. GALLINGER. Mr. President, I have great familiarity with the requirements of dental colleges at the present

time, and as compared with what was required to get a dental education a very few years ago it is very astonishing to see the great advances that have been made. Indeed, a man today graduating in dentistry has to give as much time and as much attention to his profession as he has to graduate in medicine in the very best colleges of this country. Therefore I am very strongly in favor of giving these men adequate rank and giving them liberal pay. I would not discriminate in their favor over the medical officers, but I certainly would treat them with as much generosity.

MR. DU PONT. Mr. President, may I interrupt the Senator a moment?

MR. GALLINGER. Certainly.

MR. DU PONT. The point of the matter is that the bill discriminates against the officers of the line; and I will ask the Senator if he is in favor of that?

MR. GALLINGER. Does the bill itself so discriminate?

MR. DU POINT. Yes; because it gives them superior advantages after shorter service than it does officers of the line.

MR. GALLINGER. I have not looked into that.

MR. DU PONT. That is the whole point.

MR. GALLINGER. I stand by the suggestion I made that I think they ought to be given equal rank and equal pay.

Mr. President, if any Senator will take the trouble to look thru a publication entitled "The Medico-Military Aspect of the European War," by Surg. Fauntleroy, and examine the plates in that interesting publication—which, I think, we are intending to print in rather large quantities for the use of the Senate—he can not fail to see that at the present time the requirements of the dental surgeon are certainly equally as great and important as those of the medical surgeon. The shells that are being used now, the shrapnel, are literally tearing the faces of the soldiers to pieces. They are playing so much greater havoc than ever was played in any former war that it requires very much greater attention than it ever did before, and these educated dentists are called upon to perform a service on the battle field such as was never dreamed of a few years ago.

MR. OVERMAN. Mr. President, will the Senator allow me to ask him a question?

MR. GALLINGER. Certainly.

MR. OVERMAN. In time of peace do not the soldiers require more attention now? Has it not been discovered that constant attention to their teeth prevents disease? Take Riggs's disease, for example, and other diseases of the mouth. Are there not new discoveries among the dentists in relation to those matters?

MR. GALLINGER. The Senator is right about that. If I should undertake to enumerate the diseases that are dependent upon the health of the teeth I think would astonish some Senators, because it is a fact that a decayed tooth does develop a great many diseases in the human body that need very careful attention.

But what I wanted to say, and all I wanted to say, was that with the knowledge I have of the requirements for preparation on the part of the dental surgeon, the value of his services on the battlefield, and the value of his services in time of peace, I feel that he is entitled to very liberal consideration on the part of the Senate. For that reason, any amendment that is fair to all the various classes of the Army certainly ought to be extended to the Dental Corps.

MR. POMERENE. Mr. President, a moment ago the Senator from New Hampshire asked me a question relative to the rank which is given to the chaplains. I am advised that all of

them have the rank of captain save 15, and they have the rank of major.

MR. GALLINGER. I had an impression that that was about the rank that was given to them.

MR. POMERENE. Mr. President, there seems to be some objection to the form in which I have framed my amendment, slightly decreasing the number of years of service under which they would be entitled to these promotions. If it is going to avoid any objection to the bill, I shall be quite willing to withdraw that amendment; and I do withdraw it at this moment, but I offer the further amendment on page 116, to insert, on line 5, before the word "pay," the word "rank"; and on line 9, before the word "pay," the word "rank," and on line 12, between the word "pay," the word "rank." This will then leave the bill just as it was framed by the committee—

MR. HARDWICK. Mr. President, if the Senator will pardon me, it should be inserted also on line 13 before the word "pay."

MR. POMERENE. Yes; I thank the Senator very much. Also, on line 13, I move to insert the word "rank" before the word "pay." This will leave the bill, then, just as it was framed by the committee, save that it gives to these officers the rank of lieutenant, captain, or major.

MR. GALLINGER. Mr. President, I will simply suggest that I think the Senator has made a wise amendment to his first proposition. If these men are treated just as others of the Medical Corps are treated they ought to be satisfied.

MR. HUGHES. Mr. President, I am in favor of the amendment proposed by the Senator from Ohio (Mr. Pomerene), and I would go considerably further than perhaps he desires to go. I would give rank to other civilians now connected with the Army who are engaged in such a high class of work.

I can not see any reason for denying rank to dental surgeons. I can not see any reason for denying rank to veterinary surgeons. A veterinarian is a man who spends three or four years at a high-class college. He is a gentleman. He is entitled to anything that we can give him in the way of rank. I have a further reason for it, however. If there is a single thing offensive about the United States Army, it is this caste of rank. I do not suppose there is an army in the known world where the gulf between the enlisted men and the officer exists to such a degree as it exists in the United States Army.

I want to say to you that you are never going to have an army in this country that is worthy of the name until you make the service more attractive than it is today, and one of the ways to make it attractive is in some way to democratize your commissioned staff. The spectacle is intolerable to me of these gentlemen standing back and saying that this or that set of men, who are every bit as good as they are, who are as highly educated as they are, who are performing as valuable a kind of service as they are, shall not, forsooth, have rank; that they shall not be permitted to associate with these men engaged in a common work with them, engaged in the defense of the United States of America—not engaged entirely in the occupation of seeking to increase their rank, pay, and allowances.

What reason can there be for denying rank to these men? Why, the suggestion was made to increase their pay, to increase their allowances, to let the Treasury suffer, but do not permit dental surgeons and veterinary surgeons or any other kind of surgeons or chaplains or paymasters or anybody else who is doing useful work even in time of peace to enter this sacred circle!

I am against it all. I will give rank wherever I can give rank. I will give rank before I will give pay and allowances, and I will do whatever I can do

to make it possible to have a Regular Establishment in a Republic.

We have an Army that is more incrusted with caste than the British Army. Caste is all right in England. Caste is all right in a country where men are taught to honor and respect caste in varying degree, from birth to death, but we have not any class of men in this country who are running around touching their caps and mumbling thanks for every little gratuity that is handed to them.

You are trying, and trying in vain, to have American boys put themselves in that class, and they never will do it; and you will never have an efficient Regular Army in this country as long as you make it necessary for an American boy to put behind him, at the behest of any commissioned officer, the rights and privileges that were his the moment he was born.

MR. SMITH, of Georgia. Mr. President, I wish to say only a word.

The dentists of the United States have honored a citizen of the city where I live with the position of president of their association. He has been deeply interested in this matter, and has written to me frequently about it. I feel that his pleasure at the action of the Senate would not be complete unless I, as the representative of the city, expressed also my thoro sympathy with the proposition of the Senator from Ohio, and my high appreciation of the great service that the dentists render to the health of the human race. For him I am extremely gratified, as well as for myself, at the evident purpose of the Senate to recognize the dentists in the Army with proper official title.

MR. WORKS. Mr. President, I think a mistake was made in the beginning in giving rank to anybody but the fighting force of the Army. I have never seen any reason why a chaplain or a doctor or a dentist should be called "captain" or "major." I think the title of the profession of a physician or a dentist is amply sufficient, and he should be proud of it.

The physicians and surgeons are doing a great work in the war that is going on in Europe, and they are deserving of all credit for the part they are taking in the conflict; but as we have gone so far in that direction and have allowed rank to the others, I see no reason why there should be any discrimination between them and the dentists. One is certainly as much entitled to be placed under rank as the other.

If I were to begin at the beginning, I should be in favor of dispensing with anything of that sort as to all of them. They should be paid, and well paid, for their services; but there is no reason that I am able to see why they should be given rank or called "captain" or "major" or any other title except the one that justly and fairly belongs to them. But under the conditions, as rank is allowed to the others, I feel disposed to treat the dentists just the same as the others.

The dentists of the country are undoubtedly taking a great interest in this matter. I have received, I think I may say, hundreds of letters, great numbers of letters, from dental organizations and from individual dentists who are taking a great interest in securing what is intended to be given them by the amendment which is now offered; and under the circumstances I am disposed to support it.

MR. CHAMBERLAIN. Mr. President, the committee has no feeling that the dentists ought to be discriminated against. Like the Senator from California (Mr. Works), I see that a mistake has been made in giving commissions to this class of the service, but I differ from him in that when there is a chance to stop it a little bit I believe in stopping it.

There is this difference, however, between the Medical Corps and the Dental

Corps: The Medical Corps is allowed 5 3-10 men to a thousand soldiers, while the Dental Corps, I think, has 1 to 1,000. The Medical Corps commands the hospital units. The surgeon has men under him. A young Portland friend of mine, a young doctor, went over and took charge of the Red Cross Relief Association in Belgium. He commands a body of physicians. They obey him just exactly as the enlisted men of a company obey the captain. There is that difference. The Dental Corps is a part of the Medical Corps, and comes under the supervision of the Medical Corps. That is the distinguishing difference between the two.

If the Senate is determined to amend that anyway, then it ought at least to change the time of service to conform to the time specified in the Senate bill, because otherwise you will have majors in the Dental Corps over men who have been in the active service of the Army for a longer time than they and have not gotten any higher than first lieutenant.

MR. OVERMAN. That is accomplished by the last amendment, is it not?

MR. CHAMBERLAIN. It will not do it completely.

MR. OVERMAN. It only adds to the bill the word "rank" before the word "pay."

MR. CHAMBERLAIN. I understand what that does. Adding the word "rank" just gives them all these commissions.

Mr. President, I do want to take this occasion again to say that it is no wonder that the American youth does not enlist in the Army of the United States when such speeches are made as my good friend the Senator from New Jersey (Mr. Hughes) has made here. There is not any caste in the Army except as there is a caste between an employer an an employee. There is bound to be a line of cleavage in the very nature of things. It is not because the Army officer thinks he is a better man than the enlisted man, but there is that reserve between the two which is bound to exist in the very nature of things. There is not any caste. The enlisted man in the Army of the United States is treated like a prince in comparison with many of the laboring men in this country. So, with such utterances as the Senator from New Jersey sends out to the young men of this country, no wonder the young men do not enlist to serve their country. I say they are not treated in that way. I have never found it so, and I have come in contact with them nearly everywhere.

Now, Mr. President, I am going to suggest in all sincerity that if the Senate is determined to change that provision—and it seems to be determined to change it—the Senate bill ought to be changed only by giving rank, instead of modifying.—

MR. DU PONT. Mr. President, may I ask the Senator a question before he takes his seat?

MR. CHAMBERLAIN. Certainly.

MR. DU PONT. I want to ask him if he does not think that, so far as the question between the line and the staff is concerned, the principle of caste only enters into it as between those who fight and those who do not fight, as between the fighting men and the men who do not risk their lives in battle?

MR. CHAMBERLAIN. Yes.

MR. MYERS. Mr. President, I am very heartily in favor of this amendment, which has been brought to my attention. I think very sincerely that there is merit in it. It has long been the law to give rank to surgeons in the United States Army, and I do not see why dentists who enlist to perform faithful service to their country should not receive the same distinction as surgeons.

I do not see why a line should be drawn in favor of surgeons and against dentists. I can not see the reason for

any such line of demarcation. Surely nobody would think of taking the rank away from surgeons and restoring them to the condition of privates. They render very great service to the Army, both in time of peace and in time of war. Surely no one would think of taking the rank from surgeons, to which they have long been justly entitled by recognition of law. Why should not the dentists have some recognition if they care to go into the Army, and bring their services and learning and knowledge and talents into the Army for the benefit of the country?

The dentists have to be men of knowledge and intelligence. According to the law of practically all the States now, they have to go to a professional school for four years before they can be licensed to practice their profession. In addition to that, in practically all of the States they have to have at least a high-school education, and in some States, a college education. In practically all of the States, in addition to that, they have to take their professional training of three or four years in order to become qualified to practice their profession, according to the law.

MR. GALLINGER. Mr. President, will the Senator permit me to interrupt him?

MR. MYERS. With great pleasure.

MR. GALLINGER. The truth is that a young man or a young woman who graduates from one of our first-class dental schools today takes the entire medical curriculum, except that of practice..

MR. MYERS. That is what I understand.

MR. GALLINGER. They graduate absolutely qualified to answer any question of a medical nature, as well as of a dental nature.

MR. MYERS. Yes, sir. I thank the Senator from New Hampshire for that timely suggestion. That is what I understand. They have in large part to take the medical course, to qualify themselves for a knowledge of medicine as well as of dental surgery; and why there should be any discrimination against these men who enter the Army upon the invitation of the Government, and devote their knowledge, talents and education to the service of the country, is more than I can see.

I think there is merit in the amendment. I think young men who are dentists of experience and knowledge and ability should be encouraged to go into the Army, and this amendment will surely offer them some encouragement. I think they are entitled to some distinction, more than a private soldier in the ranks, because they bring more knowledge and education and technical skill and intelligence to the discharge of their duties than a man who is a private; and if they are entitled to it, I think we ought to give it to them. I think justice demands it, and I am very heartily in favor of the amendment.

Mr. LANE. Mr. President, I am of the opinion that these men should receive the same degree of consideration as the members of the Medical Corps. Their line of training is about as severe, and in equity they should be granted the same degree of rank.

THE VICE PRESIDENT. The question is on the amendment of the Senator from Ohio (Mr. Pomerene) to the amendment of the committee.

MR. SAULSBURY. On that I ask for the yeas and nays.

The yeas and nays were not ordered.

THE VICE PRESIDENT. The question is on agreeing to the amendment to the amendment.

The amendment to the amendment was agreed to.

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OTTO U. KING, D. D. S.,
Huntington, Indiana.

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IN CHANGES OF ADDRESS both the old and new address must be given.

RENEWAL BILLS are sent one month in advance. Prompt attention to them prevents discontinuance from the mailing list. Journals are not sent beyond the subscription period.

VOL. 3 MAY, 1916 No. 2

EDITORIAL DEPARTMENT.

RECENT ARMY DENTAL LEGISLATION.

The Army Defense Bill just enacted into law has incorporated amongst its many other excellent provisions one granting improved status to the members of the dental profession in the Army.

While the legislation secured is not altogether satisfactory, it was the best that could be obtained at this time. The Legislative Committee and others worked indefatigably to secure the adoption of an equitable and at the same time conservative bill, but it was found necessary to concede some important features in order to procure the enactment of a dental provision that would grant at least some of the more important objects sought.

The results accomplished, and they are important results, are due in large part, to three things: The justice of our cause, the largely enhanced strength of our reorgan-

ized Association, and the splendid spirit shown by the officers and members of the constituent societies. Without these three factors we are satisfied that nothing could have been accomplished.

Congress in general is willing to do justice, but before enacting legislation it demands that the parties seeking such legislation shall know what they desire and make their requests in accordance therewith, and thru our well organized Association and the centralized handling of the entire matter we have been able to co-ordinate our effort and eliminate the "cross-purpose" efforts which have heretofore defeated our attempts to obtain satisfactory legislation at the hands of Congress. This is but another evidence of the necessity of organization in the modern scheme of affairs.

Just how the new dental enactment will operate is not entirely clear in some respects as yet as the following telegram received from General Gorgas, Surgeon General of the Army, May 25, 1916, will show: "Reference yours concerning Dental Corps, has not been authoratively construed by the law officers of the Government and until so constructed this office cannot formulate any opinion as to how it will operate; will notify you of ruling as soon as made."

We believe, however, that the following results have been accomplished: that the contract status has been done away with and a commissioned status in the grade of first lieutenant for new appointees substituted therefor; that the discriminating and unjust status whereby officers of the Dental Corps were required to remain permanently below the lowest ranking officers of the Medical Corps and Medical Reserve Corps, keeping them always at the bottom of the list of first lieutenants, has been corrected; we know that two additional grades have been added, that of captain and major; that a certain amount of promotion has been provided for; and that the number of dental surgeons in the Army has been increased in proportion to the increase in the Army.

Among the immediately apparent unsatisfactory features of the enactment are: the inequitable amount of service required for promotion to the grade of major; the limited number authorized for this grade; and the failure to provide for placing the detail of the administration of matters relating to the Dental Corps in the hands of a suitable member of this corps stationed in the Surgeon General's office.

We must confess that we cannot understand the reason for the conferees on this bill refusing to allow more than fifteen majors to the Dental Corps or permitting the lowering of the service requirement for the grade of major below twenty-four years when, at the same time, they agreed to require but twenty years service of members of the Veterinary Corps, established by this bill, for promotion to the grade of major with ALL members of this corps made eligible to this grade upon completion of the specified service. We are glad to see the members of the

Veterinary Corps receive this consideration at the hands of congress and believe that they are fully entitled to the recognition which has been accorded them, but, at the same time, this action on the part of the conferees serves to accentuate the injustice of some of the features of the recent enactment as relating to the Dental Corps.

We realize that in a bill dealing with as many matters as the Army Defense Bill does, it is a very difficult thing to keep out all injustices, but we hope that when the matter is again placed before congress the provisions of the section relating to the members of the dental profession will be so amended as to correct the unsatisfactory features of the present provision.

In a discussion which took place on the floor of the United States Senate on April 14th, (Page 201 in this issue) with reference to the question of like status for officers of the Dental Corps with that of other officers of the Army a great many very friendly views were expressed by various senators concerning our profession, and this, together with the action taken by the Senate at the close of this discussion, upholding the contention of the profession for a proper status for dental officers, indicated very clearly that a majority of the members of the Senate entertained a very friendly feeling toward the dental profession and toward the effort which is being made to secure better recognition for the dental officers in the Army.

Among those taking part in the discussion were: Senator Pomerene, of Ohio, who introduced the amendment under consideration and ably led the fight for its adoption; Senator Gallinger, of New Hampshire; Senator Overman, of North Carolina; Senator Thomas, of Colorado; Senator Lodge, of Massachusetts; Senator Chamberlain, of Oregon; Senator Borah, of Idaho; Senator Hardwick, of Georgia; Senator Clark, of Wyoming; Senator DuPont, of Delaware; Senator Hughes, of New Jersey; Senator Smith of Georgia; Senator Works, of California; Senator Myers, of Montana; and Senator Lane, of Oregon. Among all these there were but two who opposed the professional's plea for equality —Senator Chamberlain, of Oregon, and Senator DuPont, of Delaware.

While the matter did not come up as a separate issue in the House of Representatives it is known that the profession has a number of staunch supporters in this branch of Congress also, the most active of whom, probably, were Representatives Kahn, of California, and Hay, of Virginia.

It is but due our friends in the Senate and House of Representatives that we should express to them at this time our sincere appreciation of their friendly interest and support in our behalf, and that we should use our best efforts to further the interests of these friends of the profession in every way possible.

We wish to thank certain of the officers of the War Department for the courteous treatment received at their hands and the Surgeon General's Office for courtesies shown and assistance rendered, al-

so to express our very sincere appreciation to the members of the medical profession in general for the fraternal and kindly spirit shown.

Many members of the dental profession are also deserving of unstinted praise for their generous assistance in this matter and to them we also extend our thanks.

Members of the profession, let us take hope from the results which have been accomplished and begin anew upon a continuance of the work with a spirit which will secure to our profession the further recognition which will place the dental profession in the position in the Public Service to which it is rightfully entitled.

AMERICAN DENTAL HOSPITAL IN PARIS.

The work of the members of the dental profession in raising funds for the establishing of the "Special American Hospital in Paris for Wounds of the Face and Jaw" deserves special mention. Starting in November with the Organization of special committees in various cities the response has been especially praiseworthy. Nearly $40,000 has been raised to date and the hospital is an accomplished fact. The French government has given a building on Avenue Wagram and the work of equipping is going on as rapidly as possible. Supplies are hard to obtain in Europe and much of the equipment is being sent from America.

Donations of material have been made by the S. S. White Company, the Ritter Dental Manufacturing Co., and the Buffalo Dental Mfg. Co. These donations have been so generous that they have aggregated over $1,000. More material is needed and further donations are hoped for. The hospital is equipped with about 110 beds and 12 dental chairs, besides a mechanical labratory and cuspidores with running water at each chair.

Such men as Drs. T. W. Brophy, Edmund Kells and many others have interested themselves in this humane charity and soon there will be a call for volunteers, to serve in the hospital from members of the American profession. It must be remembered that this hospital is peculiarly the project of the dental profession in America and is the first hospital in which it was arranged for surgeons and dentists to work on an absolutely equal footing. The response from Boston, New York, Wilmington, New Orleans and the Pacific coast, has already been substantial, Wilmington raising nearly $20,000 and Chicago, Buffalo and the Middle West are carrying on an enthusiastic campaign. It is to the credit of the members of the National Dental Association that they have heard the cry of their afflicted fellows in Europe and have responded so nobly. Let us continue the work and reach the $100,000 mark.

HERBERT L. WHEELER.

ANNOUNCEMENTS.

NATIONAL SOCIETIES.

American Society of Orthodontists, Pittsburgh, Pa., July 20-22.

National Dental Association, Louisville, Kentucky, July 25-28.

National Association of Dental Examiners, July 28-29.

National Association of Dental Faculties, July 22-24.

Educational Council of America, July 24.

The Association of Military Dental Surgeons, Louisville, Kentucky, July 26-27.

The American Academy of Oral Prophylaxis and Peridontology, Pittsburg, Pa., July 20-22.

Canadian Dental Association, Montreal, Sept. 12-13-14-15.

STATE SOCIETIES.

June.

Colorado—Manitou, June 22-23-24.

Connecticut—New London, June 13-14-15.

Florida—Orlando, June 21-22-23.

Georgia—Macon, June 8-9-10.

Montana—Lewistown, June 8-9-10.

New Hampshire—Lake Sunapee, June 20-21-22.

North Carolina—Asheville, June 21-22-23.

Pennsylvania—Pittsburgh, June 27-28-29.

Southern California — Los Angeles, June.

Utah—Salt Lake City, June.

Wyoming—Casper, June 19-20.

July.

Kentucky—Louisville, July 24.

New Jersey—Asbury Park, July 12-13-14-15.

Porto Rico—San Juan, July.

South Carolina—Chick's Springs, July 11-12-13.

Wisconsin—Wausau, July 11-12-13.

October.

District of Columbia—Washington, October 19 and monthly.

Virginia—Richmond, October 18-19-20.

November.

Arizona—Phoenix, November.

December.

National Capital—Washington, December 5 and monthly.

Ohio—Dayton, December 5-6-7.

MEETING TENNESSEE BOARD OF DENTAL EXAMINERS.

The next meeting of the Tennessee Board of Dental Examiners will be held at Nashville, Tennessee, commencing Monday at 10 A. M., June 12th, and continuing thru Friday, June 16th.

For full information and application blanks apply to

DR. WALTER G. HUTCHISON,
Secretary,
308 Eve Building, Nashville, Tenn.

FORTY-SIXTH ANNUAL CONVENTION NEW JERSEY.

The Forty-sixth Annual Convention of The New Jersey State Dental Society will be held at Asbury Park, N. J., on July 12th, 13th, 14th and 15th, 1916.

The spacious glass enclosed Casino over the ocean has again been secured for the Exhibits and Clinics. Dr. A. S. Burton, of Asbury Park, as Chairman of the Exhibit Committee, expects to surpass last year's display, which was the greatest in the history of the Society. Dr. George W. Wakeley, of Orange, is Chairman of the Clinic Committee and having served on that committee for

three years is well qualified to present those clinics of greatest interest.

The headquarters of the Society will be located at the West End Hotel, just across the ocean drive from the Casino. Special rates to be, single room (one person), $3.50 per day, double rooms (two persons), $6.00 per day. Weekly rates of $20.00 for one and $30.00 and $35.00 for two persons. The ball room at the hotel will be used for all meetings of the Society and Dr. James I. Woolverton, of Trenton, Chairman of the Essay Committee, has arranged for three essayists of prominence to present subjects of interest.

A cordial invitation to attend is extended to all ethical practitioners.

JOHN C. FORSYTH, Secretary,
430 East State Street,
Trenton, N. J.

ASSOCIATION OF MILITARY DENTAL SURGEONS.

The Third Annual Meeting of the Association of Military Dental Surgeons of the United States will be held at Louisville, Kentucky, July 26th and 27th, 1916. Headquarters: Seelbach Hotel.

J. D. MILLIKIN, President.
S. W. Hussey, Secretary.

STATE BOARD OF REGISTRATION AND EXAMINATION IN DENTISTRY, STATE OF NEW JERSEY.

The State Board of Registration and Examination in Dentistry of New Jersey will hold their annual meeting and examination in the Assembly Chamber, at the State House, Trenton, N. J., on June 26th, 27th, 28th, 29th, 1916. License fee $25.00. Re-examination fee $10.00. No interchange of license.

Practical tests required: Insertion of an approximal gold filling, with approximating tooth in position, compound approximal amalgam filling, a silicate filling, practical test of the applicant's ability in oral prophylaxis and preparation of a cavity for an inlay with wax pattern. Also the soldering of a bridge consisting of three or more teeth, exclusive of abutments, and one Richmond crown (which may be one of the abutments of the bridge). These must be made of gold or silver. The bridge must be struck from dies made from an impression of the mouth and the articulating model with the bridge, when soldered, must be submitted for inspection. An anatomical articulation of a full upper and lower set of teeth will also be required. Teeth to be furnished by applicant. Wax bite properly trimmed and in place on models for inspection before setting up teeth.

Attention is directed to the following quotation from the dental law of New Jersey: "Applicant shall present to said Board a certificate from the Commissioner of Education of this State, showing that **before entering a dental college** he or she had obtained an academic education consisting of a *four year course of study in an approved public or private high school or the equivalent thereof." In accordance with this law the secretary will issue application blanks only upon presentation of the required certificate from the Commissioner of Education, State House, Trenton, N. J.

*Those who entered a dental college prior to January 1st, 1914, must present a certificate showing a three year high school course.

Applications must be filed complete ten days before the date of the examination. Address all communications for further particulars to the secretary.

JOHN C. FORSYTH, Secretary,
430 East State Street, Trenton, N. J.

OHIO STATE DENTAL BOARD.

The Ohio State Dental Board will hold its 1916 June examination in the city of Columbus. The practical examination will commence Monday, the 26th, at 8:30 A. M., at Ohio State University

Dental College and the theoretical examination, at 8:30 A. M. Thursday of the same week at Ohio State University Armory on the University Campus.

OHIO STATE DENTAL BOARD,
R. H. Vollmayer, Secretary

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The National Association of Dental Examiners will hold their 34th annual meeting in Louisville, Kentucky, July 28th and 29th, 1916.

All State Boards, not members, are urgently requested to become associated with this organization, for the promotion of uniform standards, higher qualifications and mutual benefits to be derived from a more intimate acquaintance.

For further information address the secretary.

DR. C. M. McCAULEY, Pres.,
DR. J. A. WEST, Sec'y. Dallas, Tex.
Des Moines, Ia.

THE AMERICAN ACADEMY OF ORAL PROPHYLAXIS AND PERIDONTOLOGY.

The annual meeting of the American Academy of Oral Prophylaxis and Peridontology will be held at the Wm. Penn Hotel, Pittsburgh, Pennsylvania, July 20-21-22, 1916.

J. HERBERT HOOD, Secretary,
1102 New England Building,
Cleveland, Ohio.

BOARD OF DENTAL EXAMINERS, STATE OF WYOMING.

The Wyoming Board of Dental Examiners will meet to hold examinations of applicants at the state house in Cheyenne, Wyoming, on the 27th, 28th, and 29th of June.

The written examination consists of Anatomy, Physiology, Histology and Bacteriology, Chemistry and Metallurgy, Oral Surgery, Anæsthetics, Operative and Prosthetic Dentistry, Materia Medica and Therapeutics, Propylactics and Orthodontia.

Applicants must present a full plaster model of upper and lower jaws with teeth, also one without teeth. Practical work will be required from all candidates taking examination. The candidate is required to furnish his own operating instruments, dental engine, amalgam, gold, wax and modeling compound.

For further information and application blanks, address Peter Appel, Jr., Secretary, P. O. Box 643, Cheyenne, Wyo.

IOWA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Iowa State Board of Dental Examiners for the examination of applicants will be held at Iowa City, Iowa; commencing Monday at 9:00 A. M.; June 5th, 1916.

For further information address the secretary,
J. A. WEST,
Des Moines, Iowa.

SPECIAL ENTERTAINMENT FOR WIVES AND DAUGHTERS AT LOUISVILLE.

Please impress upon the members of the National Dental Association that on account of their being very busy at this meeting, they will not have time to entertain their wives or daughters when they bring them to our city. All we want is for the ladies to come, when the entertainment committee will take them in charge. **First** will be a trip to the country club, luncheon, and an automobile ride. **Second,** a visit to Fountain Ferry Park, with matinee and refreshments. **Third,** a shopping trip with lunch thereafter. **Fourth,** a trip up the river by boat, cabaret show and luncheon. In order that those who desire, may have an opportunity of visiting

Mammoth Cave at the close of our meeting, a special train will leave Saturday morning at 8 o'clock, arriving at the cave hotel at 11:30, in time for luncheon, then go thru the cave, have dinner at the hotel at 6:00 and arrive back in Louisville at 9:40 P. M. This is the only part of the entertainment which will be offered to our visitors, for which a fee of $7.50 will be charged.

Respectfully,
MAX M. EBLE, D. D. S.,
Chairman on Entertainment,
908 Starks Building,
Louisville, Ky.

REPORT OF COMMITTEE ON TRANSPORTATION.

Chicago, April 9, 1916.

The Committee on Transportation has applied to the several passenger associations for rates to the N. D. A. meeting in Louisville, and has been granted a two cent fare per mile traveled over the lines of the Central, Trunk Line, and New England Associations, which include the New England States, New York, Pennsylvania, Maryland, West Virginia, Ohio, Indiana, Michigan and the greater portion of Illinois. The Western, Trans-Continental, Southwestern and Southeastern Passenger Associations advise that summer Tourist rates will be in effect, and available, at that time, making the fare at about the two-cent rate for the whole United States.

Train schedules and tariffs for the various territories will be published in the next issue of The Journal of the National Dental Association.

D. C. BACON, Chairman,
31 N. State St., Chicago, Ill.

THE WYOMING STATE DENTAL ASSOCIATION.

"Wyoming State Dental Association will meet in Casper, Wyoming, on June 19 and 20. As this is the first meeting of the Wyoming State Association we hope to have a rousing meeting. A cordial invitation is extended to all members in good standing, of the National Dental Association, or of any state dental society."

Yours truly,
PETER APPEL, Jr.

UTAH STATE DENTAL SOCIETY.

The Utah State Dental Society will hold its annual meeting at the Hotel Utah, Salt Lake City, June 22nd to 24th, 1916.

E. C. FAIRWEATHER,
Sec'y-Treas.,
601 Boston Bldg., Salt Lake City.

VIRGINIA STATE DENTAL ASSOCIATION.

The annual meeting of the Virginia State Dental Association will be held October 18-19-20, 1916, in Richmond, Virginia.

Our officers are planning for one of the greatest meetings in the history of our Association.

WILLIAM PILCHER, Petersburg, Va.,
President.
C. B. GIFFORD, Norfolk, Va.,
Corresponding Secretary.

KOLYNOS

The theory that Pyorrhea is caused by Amebae may or may not come to be generally accepted. One fact is, however, plainly established.

KOLYNOS DENTAL CREAM is a Powerful Amebicide.

We quote below from a report upon "An Investigation into the Amebicidal Properties of Kolynos Cream and Kolynos Liquid," by Dr. Leo F. Rettger, Assistant Professor of Bacteriology and Hygiene, Sheffield Scientific School, Yale University.

"1. Kolynos Dental Cream has a decidedly destructive action on amebae and must therefore be regarded as a strong amebicide. Even in as high a dilution as 1 part of the cream to 300 parts of water, the disinfectant action is complete within 15 minutes, provided encysted forms of the amebae are absent. In dilution of 1 to 400, the action was complete in 30 to 60 minutes. In 1 to 200 solutions very few amebae remained alive after an exposure of 5 minutes.

"2. Liquid Kolynos has practically the same amebicidal action as the dental cream, being a trifle stronger than the cream."

These facts, whether the Amebic Theory be confirmed or rejected, must still have a great interest to all dentists who are familiar with the great efficiency of Kolynos.

SAMPLES MAILED UPON REQUEST.

THE KOLYNOS COMPANY

NEW HAVEN, CONNECTICUT